OCTOBER 10, 1955

NEWS ISSUE

Electrical World

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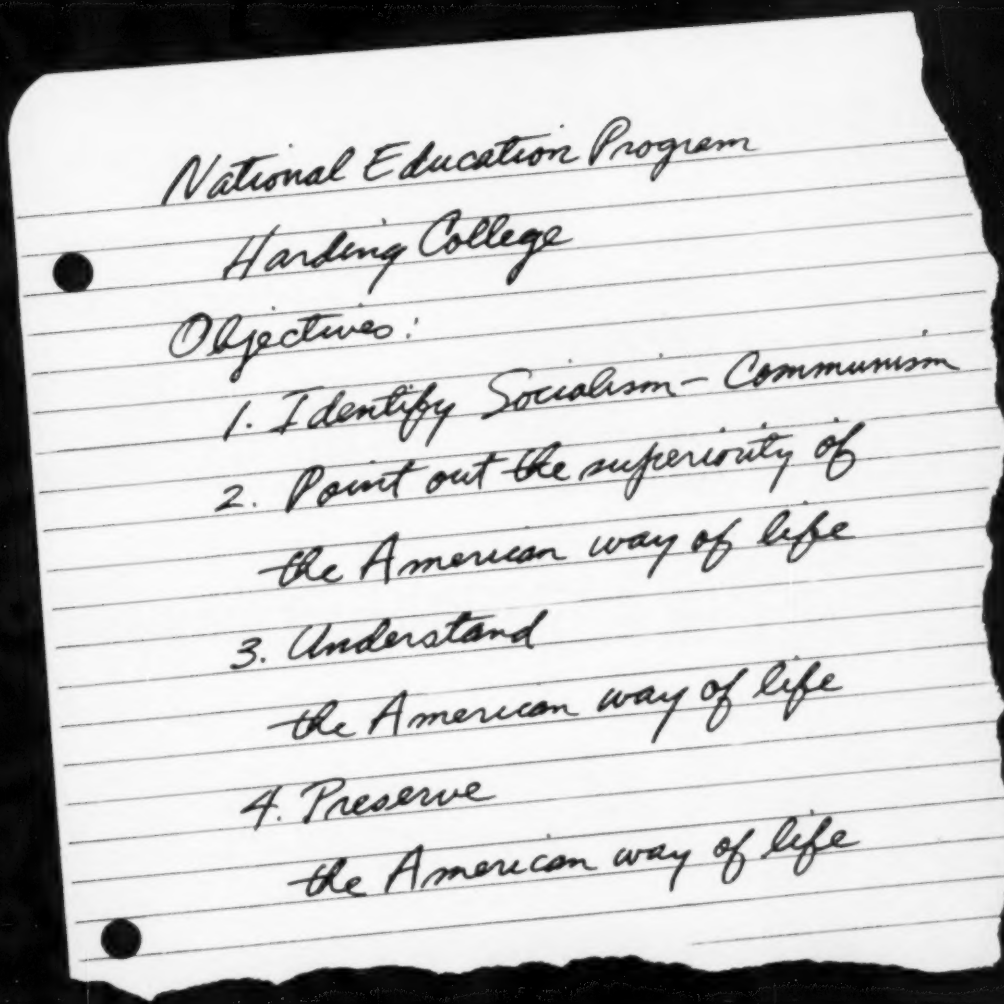
National Education Program
Harding College
Objectives:
1. Identify Socialism – Communism
2. Point out the superiority of the American way of life
3. Understand the American way of life
4. Preserve the American way of life

With Objectives of Harding College Program in Mind . . .

Utility Outlines Socialism's Dangers . . . Page 16

MEETING REPORTS

. . . Pages 18, 22, 25, 44 and 49

E R POWER
UNIVERSITY MICROFILMS I
313 N 1 ST
ANN ARBOR MICH

Personalized discussions on distribution transformer trends are helping many utilities plan for future load growth. Here, C. E. Sutton, Jr. (standing), Manager—Distribution Transformer Sales, reviews industry's total investments, trends in equipment types that promise help in system expansion.

Continued rapid growth in residential load suggests

NEW LOOK AT YOUR DISTRIBUTION EXPENDITURES

New distribution transformer plant. G.E.'s 20-million-dollar Hickory Plant being built in North Carolina, demonstrates G.E.'s confidence in the continued huge growth of domestic load. Here, J. T. Elrod (left), Manager—Marketing, and R. W. Smith, General Manager, of G.E.'s Distribution Transformer Dept., view architect's drawing of new plant.

Utilities may invest 1.5 billion in distribution equipment by 1963

While today's dollar and man-hour investments in generating equipment still tend to hold the headlines, many electric utilities are finding that they can benefit greatly by re-evaluating their distribution system needs of the future.

PLANNING NECESSARY

With domestic load growth showing all indications of tripling by 1965, many utility men recognize that this year's 182-million-dollar investment in distribution equipment may easily soar to 479 million by 1963. This huge expenditure demands sound planning for the future if utilities are to expect to expand their distribution systems economically and effectively.

FUTURE FLEXIBILITY

From the system designer's standpoint, these statistics present a challenge—and an opportunity—for far-sighted thinking. Study of kva, voltage, protection, and phase, for example, open new avenues for planning to meet today's system demands and at the same time allow sufficient flexibility to accommodate the tremendous load growth on the horizon.

Has your company taken a new look at your distribution system investments lately? Full information to help system planners is available from your local G-E Apparatus Sales Representative. General Electric Company, Schenectady 5, New York. 301-305

MORE POWER TO AMERICA

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Vol 144 No 15 October 10, 1955

EDITORIAL AND COMMENTARY

Editorials 5
Technical Notes 62

INDUSTRY NEWS

Electrical Week 6
Current Events 8, 15
News about People..... 36
Meetings Calendar 43
In the Industry..... 62

MANAGEMENT

Business Outlook 60
Finance and Regulations..... 63
Statistics 66

SALES

Commercial 55
Residential 55

EQUIPMENT

Manufacturing and Markets... 56

MANAGEMENT- Public Relations

UTILITY OUTLINES SOCIALISM'S DANGERS..... 16

RELAYING-PROTECTION- Design

ELECTRONIC RELAY SOLVES PROTECTION PROBLEM ON TRANSMISSION LOOP 30

MANAGEMENT- Public Relations

QUERY CUSTOMERS BY MAIL..... 48

MEETINGS

PUBLIC UTILITIES ASSOCIATION OF THE VIRGINIAS..... 18
PENNSYLVANIA ELECTRIC ASSOCIATION—Engineering and Operation Section 22
SOUTHEASTERN ELECTRIC EXCHANGE 25
ROCKY MOUNTAIN ELECTRIC LEAGUE 44
EDISON ELECTRIC INSTITUTE—Industrial Relations Committee..... 49

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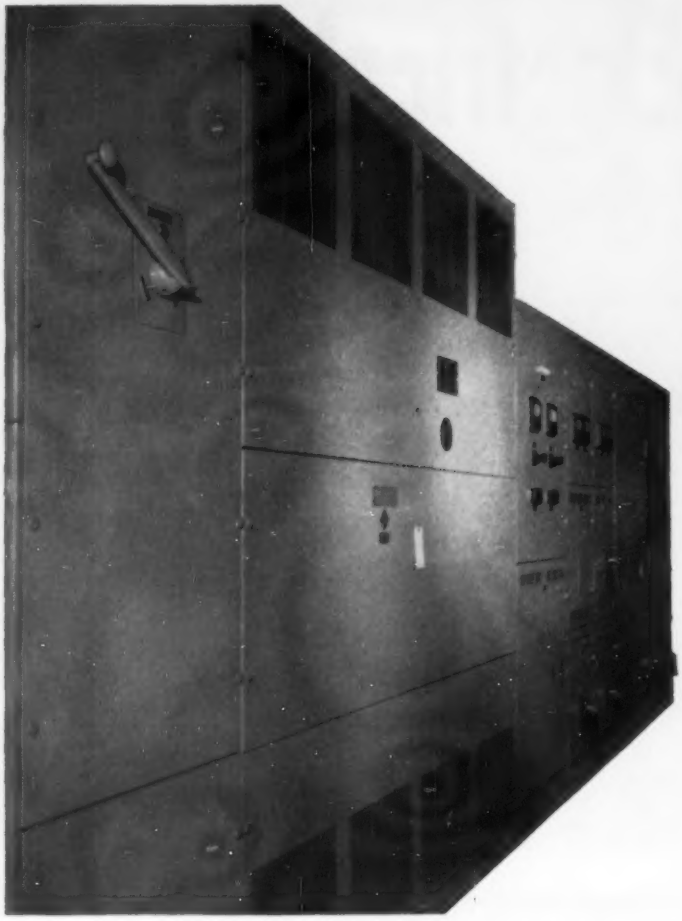
COMING NEXT WEEK—For the ninth time Electrical World presents a Steam Station Cost Survey. Detailed reports on 54 stations built in last two years are included.



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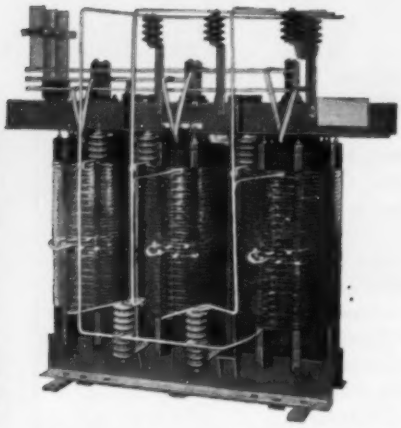
...the choice of leaders in industry



predesigned power for PACKARD

Studebaker-Packard's new facilities are planned for greatly increased productivity—and part of that planning is a modern electrical distribution system, with plenty of unit substations to put power where it's needed at the right voltage for use.

This 2000 Kva, 4800 to 480 volt unit substation feeds power to stamping operations for Packard. Its heart is a Wagner dry-type transformer like the one illustrated.

Wagner unit substation transformers are "Predesigned." This completely eliminates individual job engineering because the standard ratings in which they are built are coordinated with the specifications of every unit substation builder.

When you specify Wagner "Predesigned" transformers you get the advantages of a proved design in a completely assembled and tested transformer—you reduce your costs—and get quick delivery.

Wagner unit substation transformers can answer your power needs just as they do at Packard. Choose Wagner for your next load-center installation. Consult the nearest of our 32 branch offices or write for Bulletin TU-205. It gives full information on Wagner Unit Substation Transformers for industrial power distribution systems.

Wagner Electric Corporation
6456 Plymouth Ave., St. Louis 14, Mo., U.S.A.

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

WT55-6

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES • AUTOMOTIVE BRAKE SYSTEMS-AIR AND HYDRAULIC

EDITORIALS

You May Win

When Father Time writes upon his scroll the names of the companies who have won the Edison Electric Institute awards for 1955, will your company's name be among them? It may be if you will take the trouble to enter the competition. Full details on each award are probably neatly tucked away in a file not far from your desk. If you can't track them down, EEI will be glad to supply the information.

As the year-end nears, it will pay you to consider entering the competition. The national recognition, the boost in employee morale are fair compensation for the little extra effort required. One of the better measurements of our labors is the approbation and recognition accorded us by those familiar with our daily routine. Such measure is made in the EEI competition.

This year there are ten awards to be made. Seven in the sales field, one each for lighting education, annual reports, and exceptional valor. But there is one rule common to all competition. You can't win if you don't enter.

The Need for Personalized Service

These are the days of specialization, of efficiently organized service calls, of the monthly postal card power bill. Care must be taken that the streamlining does not deprive the utility of its personal touch. Machines and routines are important, but it is people—human beings—who are the customers. They control the fate of the industry.

In a recent address Board Chairman Horace P. Liversidge, Philadelphia Electric Co, spoke on this subject:

"By the very nature of our services, we are and will be regarded by the general public as 'big business.' Even the smaller utility companies are big by ordinary standards. Thus, we must never fail to administer our responsibilities for service with a keen appreciation of a very simple truism—that an understanding public holds the key to most of the hurdles we are likely to encounter. And personalized service— or close attention to the human relations element at every point of our activities and services—is the surest way to win that understanding.

"We earn the good opinion of the public by deeds—not words. As we build for the future, our cornerstones must be courteous and considerate treatment, reliable service, fair and reasonable rates, and the day-to-day application of the fundamentals of human relationship.

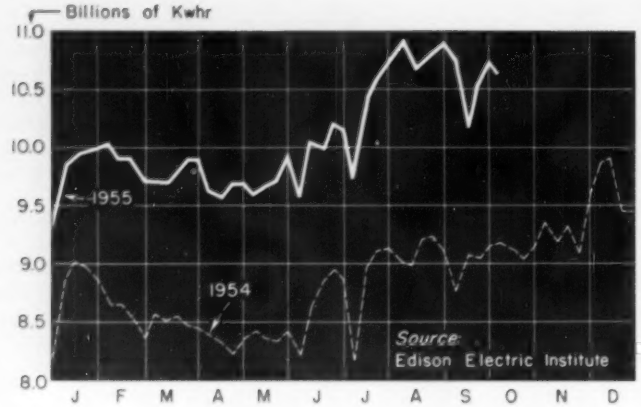
"This basis of operation brings results that cannot be excelled and is the best guarantee of safe, sound, and economic expansion."

Hurricane Duty

Electric utilities seldom get recognition they merit for outstanding performance under trying circumstances. That has been the case again this year following the hurricanes that have ravaged systems along the eastern seaboard.

We were particularly glad to report in a recent issue (EW, Sept. 26, p30) some examples of the devotion to duty and ingenuity displayed by utility employees. In dramatic pictures we showed how one utility team had used a helicopter to aid in reconstructing a transmission line. We also showed how this same utility had employed telegraph wires to replace a distribution line during an emergency. Other pictures showed crewmen of another utility rafting materials over the swollen Brodhead Creek by means of a tow line with all bridges out.

Stories such as these perform double duty. They tell of tried techniques which may be used by others in future emergencies. They bring a measure of recognition to the men who devised them.



OUTPUT

Week Ended Oct. 1
10,627,000,000 Kwhr
Up 16.0%

Atomic Energy Commission requirements — 1,005,000,000 kwhr (Electrical World estimate). Excluding AEC, output increase was 10.8%

Per Cent Change From Previous Year

	Total US	New Eng.	Mid. Atlan.	Cent. Ind.	West Cent.	South-east	South Cent	Rocky Mount.	Pacific NW	Pacific SW
Oct. 1	+16.0	+10.3	+7.6	+26.6	+8.0	+19.4	+12.3	+24.0	+10.4	+ 9.5
Sept. 24	+18.6	+12.1	+10.6	+30.2	+12.1	+22.3	+14.3	+22.8	+10.6	+10.6
Sept. 17	+17.1	+10.6	+8.4	+27.8	+9.7	+20.8	+10.4	+21.6	+12.2	+14.8

Seasonally Adjusted Index 203.7 Week Ago 205.9 Year Ago 203.7

News Highlights—First atomic trade fair reveals reactor details, 75 manufacturers and other organizations display work, 7,000 attend . . . Rising copper prices have pushed industries into search for substitutes; Western Electric takes first big step . . . Consolidated Edison of N. Y. and Duquesne Light push ahead with atomic power plans . . . FPC rejects petition to rehear its order authorizing Idaho Power's Hells Canyon development.

Higher Voltage Distribution Economical—or Is It?—Savings up to 30% were claimed by R. F. Lawrence, Westinghouse Electric, for 254/440-v service to heavy load residential developments at EEI's Transmission and Distribution meeting in New Orleans. But D. K. Blake, General Electric, suggested that 120/240-v system of similar simplicity would cut savings so low that inconvenience would make the change undesirable.

Power without Generators—When the hydrogen bomb's power is harnessed, electrical energy may be taken directly from the thermonuclear system without use of a steam generator. This was hinted by AEC Chairman Lewis L. Strauss last week when he revealed that five laboratories have launched a massive hydrogen-for-peace attack. The operation, Project Sherwood, can succeed in 20 years, Strauss predicted.

Security Sales Lower—Public security offerings of electric utility industry amounted to approximately $1 billion for first nine months of 1955 as compared with $1,847 million for like 1954 period, Reis & Chandler, Inc, has reported. Of this amount, about $870 million was "new money" in 1955 vs $1,395 million in 1954. Private security offerings totaled at least $100 million in first nine months of 1955 vs $172 million a year ago.

Pennsylvania Strike Spreads—UWUA-CIO workers on strike at New Castle plant of Pennsylvania Power Co have established limited picket lines around four Ohio Edison Co plants in Ohio, protesting the latter exchanging power with its subsidiary, Penn Power, during present strike now going into third week. Hourly employees of Ohio Ed at four picketed plants have refused to cross picket line. However, Ohio Ed officials point out that power flows back and forth between the two companies from day to day in normal course of operation. Supervisors, replacing absent workers, also maintain normal plant operation at two struck utilities.

NEWS OF THE INDUSTRY BRIEFLY TOLD

Off the Washington Wire—AEC sets up a blanket program to permit businessmen to engage in unclassified atomic activities overseas, except in 15 Soviet-bloc countries. Authorization does not cover classified information which still requires prior commission approval. . . . Pacific G&E asks permission to add two more 54,000-kva units to its Balch project on North Fork of Kings River and to revise plans for its hydro project on North Fork and Helms Creek. . . . Government officially announced reopening of electric power expansion goal until Dec. 31. Goal, closed down for restudy recently, aims at 150 million kw of national capacity by 1958.

Electric vs Gas—Home builders in Orange County, Calif., have threatened restraint-of-trade suits against Southern Counties Gas Co over charge made for service piping to tract homes built with electric kitchens. Charge, made under California PUC authority granted in 1948, averages $55 per home. Southern Counties and Southern California Gas Co say levy is made not to discourage electric installations but to save "average" gas-using homes from bearing burden of installation costs to homes with mostly electric equipment.

AIEE's Fall General Meeting—AIEE Pres M. D. Hooven: "If the machine age is to be a thinking machine age, it will be the electrical engineer who will design the thinking machine" . . . J. A. Hutcheson, vice president of Westinghouse, surveyed past progress of the electrical industry and predicted: Production of superconductivity material, having resistance of zero, by placing material in a magnetic field at very low temperatures; and the improvement in materials by reduction of impurities to less than the one part per million that has been considered good.

Oklahoma Utilities under Eye—Subpoena powers were granted to a nine-man state committee formed recently to investigate Oklahoma utility rates and practices.

New York State Gets Atomic-Minded—Gov Averell Harriman established a Council on Use of Nuclear Materials last week to enforce atomic safety, promote industrial use of atomic energy, and coordinate with AEC. Council members are commissioners of health, labor, and commerce departments.

Obituary—Irving T. Bennett, 55, board chairman and chief executive of General Cable Corp, died Oct. 3 at Irvington-on-Hudson, N. Y.

ABOUT PEOPLE IN THE INDUSTRY

Taxes now constitute "tremendous burden on enterprise," Rochester G&E Pres A. M. Beebee told New York Security Analysts. "As result, tax-avoiding areas not only compete unfairly with other areas in national markets but also entice industries and people from other areas . . . Perhaps most unfair situation attached to public power programs is they not only avoid taxes in their operation, but in sale of power they give preference to groups who also avoid taxes. This is discriminatory and un-American," he said.

The atom "is struggling against a great handicap—the handicap of trying to make its way into one of the most dynamic, best-run industries in the world," Westinghouse Pres G. A. Price said last week at dedication of Toledo Edison's Bay Shore Station. But with country's insatiable appetite for electric power "it is obvious that atomic plants will prove invaluable supplement to conventional plants. . . . We are ahead of schedule in atomic energy and are moving fast. Major technical break-throughs have been accomplished."

More News About People page 36

7,000 Attend First Atomic

- **Atomic Industrial Forum sponsors show with 75 exhibits**
- **McCune accents free flow of information as key to markets**
- **Power reactor details disclosed; Britain, Canada participate**

We must rely on technological progress gained through interchange of information to lead the world market for nuclear equipment.

This advice was given by F. K. McCune, vice president and general manager of General Electric Co's Nuclear Products Division, in an address to the annual meeting of the Atomic Industrial Forum held recently in Washington, D. C. McCune said this country must also solve the problems of making nuclear fuel available to potential foreign customers, providing adequate hazard insurance for atomic installations, and winning widespread public acceptance for atomic development projects.

Also sponsored by the Forum was the first U. S. trade fair of the atomic industry. The displays of some 75 manufacturers and organizations whose materials are of vital interest in this new industry were viewed by a large audience. Attendance totaled more than 7,000 and included many foreign visitors.

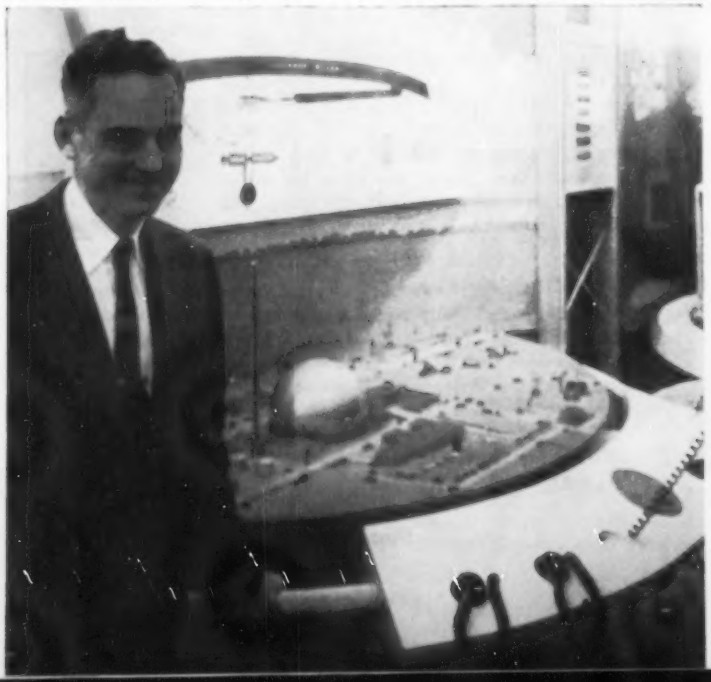
The exhibitors represented all major segments of the industry and included foreign displays from the United Kingdom and Canada.

Spurred on by the wide exchange of nuclear information at the recent Geneva Conference, equipment manufacturers and technical groups gave progress reports and detailed accounts of the various power reactors planned for operation in the near future.

In describing the reactor and its associated equipment for the Consolidated Edison Co of N. Y. Indian Point Station, W. C. Gumprich, head of reactor design for Babcock & Wilcox Co's Atomic Energy Division, indicated that thorium was chosen as the fertile material on the basis of favorable long-term reactivity characteristics and relatively good structural resistance to fission damage. He said estimated gross plant efficiency for this station was about 34%.

O. B. Falls, Jr, marketing section manager of GE's atomic power equipment department, predicted that experience gained in construction and operation of the reactor for the Commonwealth Edison Co group will lead to power reactors with high temperatures and pressures, thus providing increased thermal efficiency.

F. K. McCUNE, head of General Electric's Atomic Products Division, stands beside model of dual cycle boiling water reactor designed for Nuclear Power Group



Sodium Graphite Reactor

High coolant temperature (950F) and the ability to be adapted to many types of fuel were cited by C. Starr, North American Aviation, Inc, as two advantages of the sodium-graphite power reactor that will be built for Consumers Public Power District of Nebraska. Present estimates of total energy cost for this 75-Mw plant are 10 to 11 mills per kwhr, he said, but by using thorium as the fuel, increasing the size to 125Mw, and improving the steam conditions it is felt that a future unit's total energy cost would be in the 6-to-7-mill range.

Another Sodium Approach

The other sodium approach to reactor design was described by A. Amorosi, technical director of Atomic Power Development Associates, Inc. In describing the fast neutron breeder reactor, he said that the use of sodium coolants permits operation at high temperature without high pressure, providing an opportunity for a relatively high steam-cycle efficiency.

The Shippingport plant was described in detail by J. C. Rengel, PWR project manager for Westinghouse Electric Corp. He indicated that this pressurized water reactor plant will have a 60-Mw output, but designers are confident operation and tests will allow increase to 100-Mw in the future.

Trade Fair

In addition to descriptions of planned power reactors, information about reactors in the study or proposed stage was revealed.

Studies indicate that a thermal breeder reactor making use of the U-233-thorium cycle and using pressurized heavy water as the coolant and moderator could ultimately produce electric power for 7 mills per kwhr. Details of design were described in a paper jointly authored by D. Kallman and M. C. Edlund both of the Babcock & Wilcox Co.

Homogeneous Breeder Reactor

Another approach to power reactors, the homogeneous breeder, was described by J. W. Cartinhour, manager, nuclear energy department of Foster Wheeler Corp. Cartinhour said that safety features and economy can best be achieved by metering fuel to the reactor exactly as is done in all successful steam generating units.

A report on the liquid metal fuel reactor project was given by L. D. Stoughton of the Brookhaven National Laboratory. This project is beginning to move from the laboratory stage into the pilot-plant stage. It is a breeder reactor using a solution of uranium in molten bismuth as fuel.

Free Enterprise Pushed

The Atomic Energy Commission was well represented by a string of legal experts who reported on the Commission's efforts to get the free-enterprise ball rolling in this new industry.

C. D. Luke, director of AEC's Division of Classification, said that the Classification Section of the Commission will immediately review the most important classified reports (there are 20,000 classified formal reports in the AEC central files) and declassify whatever is possible in order to help the Civilian Application Program.

A good start has been made in solving the problem of conflicting state and federal regulations of the infant atomic industry, according to H. L. Price head of AEC's Civilian Application Division. During the past summer representatives of 39 states met with the commission to exchange views on the subject. Price said the meeting indicated that all concerned showed a willingness to cooperate.

EXHIBIT HALL where 75 manufacturers and organizations display their work

TOURING EXHIBITS are W. L. Cisler, Detroit Edison President; Lewis Strauss, AEC head; and Oliver Townsend, Charles Robbins, D. J. Sherer, all of Forum

C. A. Nelson, head of AEC's Inspection Division, said that the following will be covered in a typical inspection of a reactor in operation:

1. Dynamics of reactor, fundamental characteristics.

2. Control system, versatility and margin of control.

3. Safety system, automatic action and interlocks.

4. Instrumentation, responsiveness and dependability.

5. Personnel, training and competence.

6. Operating and emergency procedure.

7. Safety factors, inherent or built in.

8. Radiation protection for personnel and equipment.

Comments and advice on how to approach the nuclear industry were offered by several industrial experts.

The development of electric power

(*Continued on page* 10)

FUEL ELEMENTS (models) and B&W Pres Alfred Iddle (l), AEC's Dr Libby

Atomic Fair

(*Continued from page 9*)

from nuclear energy is still so highly experimental—and so costly compared with plants powered by water, coal, or oil—that it needs some form of initial subsidy. But this subsidy, said W. F. Mullestein of Lukens Steel Co, may of course be assumed by private capital, if the privately owned corporation has enough resources and enough faith in the ultimate return, and is able to assume the long-term risk.

Promotion and Quality Accented

How good a company's products are and how well it promotes them from now until 1960 will in large measure determine its permanent position in the nuclear energy industry. G. R. Molesworth of Molesworth Associates stated that a company shooting for leadership in this market must launch major sales and promotion programs now if it is to meet and defeat competition in the critical five-year period ahead.

Potential buyers of nuclear equipment should evaluate their needs as thoroughly as possible before asking for a proposal. If they want a proposal for budget purposes only or for a feasibility study, they should say so. This advice was offered by J. W. Landis of Babcock & Wilcox, Atomic Energy Division, not only because a detailed proposal requires a large investment of both time and money, but, even more important, it requires large chunks of all-too-scarce nuclear talents. If the buyer has a definite idea of what he wants, the equipment manufacturer can make the best use of the talents available, Landis said.

A-Power Future Hinges on Cost

Until the cost of nuclear fuel manufacture and reprocessing can be brought down considerably, it does not appear that nuclear power will be competitive with power from conventional power plants. This opinion was offered by S. B. Roboff, Atomic Energy Division, Sylvania Electric Products, Inc.

Another opinion on the fuel part of the business was offered by W. E. Kelley, vice president of Catalytic Construction Co, who feels that under the present system of government controls it is not possible to properly integrate feed materials with other phases of the expanding nuclear industry.

Copper Substitutes Sought . . .

. . . with Western Electric taking big step to switch to aluminum, other metals; Meissner scores high prices with ample supply

The recurring question—"Is copper pricing itself out of the market?"—was at least partially answered by two developments in recent days:

- One of the nation's largest users of copper announced a program to switch from copper to aluminum because of "concern over sharply rising prices."
- A government official told the industry: "The copper situation can be summed up in one word—price."

Shortage Growing Since War

As copper shortages have continued to plague the country since World War II, there has been a gradual but consistent tendency to substitute aluminum and other materials for copper. But the biggest step in this direction has come with the announcement by Western Electric Co, which furnishes cable and wire to Bell Telephone companies throughout the country, that it will move ahead with a definite program looking toward the substitution of aluminum for copper.

Initially, facilities are being set up to develop suitable processes for quantity production of aluminum conductors for certain sizes of telephone cables. This program will be stepped up by converting more facilities now used for drawing copper wire to the extent dictated by future overall economic and supply considerations, states Western Electric.

Western Electric's concern has not been purely with the question of price but also the "disruption in production schedules which shortages have caused." Nevertheless, it states the program of substituting aluminum for copper "will result in material savings based upon present prices of the two metals."

258% Price Rise in Ten Years

The company notes that copper is presently selling at 258% above levels prevailing in January 1946. The rise in the price of aluminum in this same period has been only about 63%. "Furthermore," WE stated, "aluminum prices have been subject to less violent fluctuations." Copper today is selling at 43¢ a lb by some producers, and at 50¢ a lb by custom smelters.

One highly placed official in the copper industry sees no cause for alarm in Western Electric's announcement. He regards the move as a maneuver by WE to "scare" the copper producers into stabilizing price and supply.

Insufficient Low-Price Supply

The government official discussing price was William A. Meissner, Jr, deputy director of the Business and Defense Services Administration's Copper Division. He spoke to wire and cable section meeting of the National Electrical Manufacturers Association at Sky Top, Pa. Said Meissner, "There is sufficient copper physically available to meet your requirements, but there is not sufficient low price copper to meet your requirements." "The Administration does not favor price controls," he added.

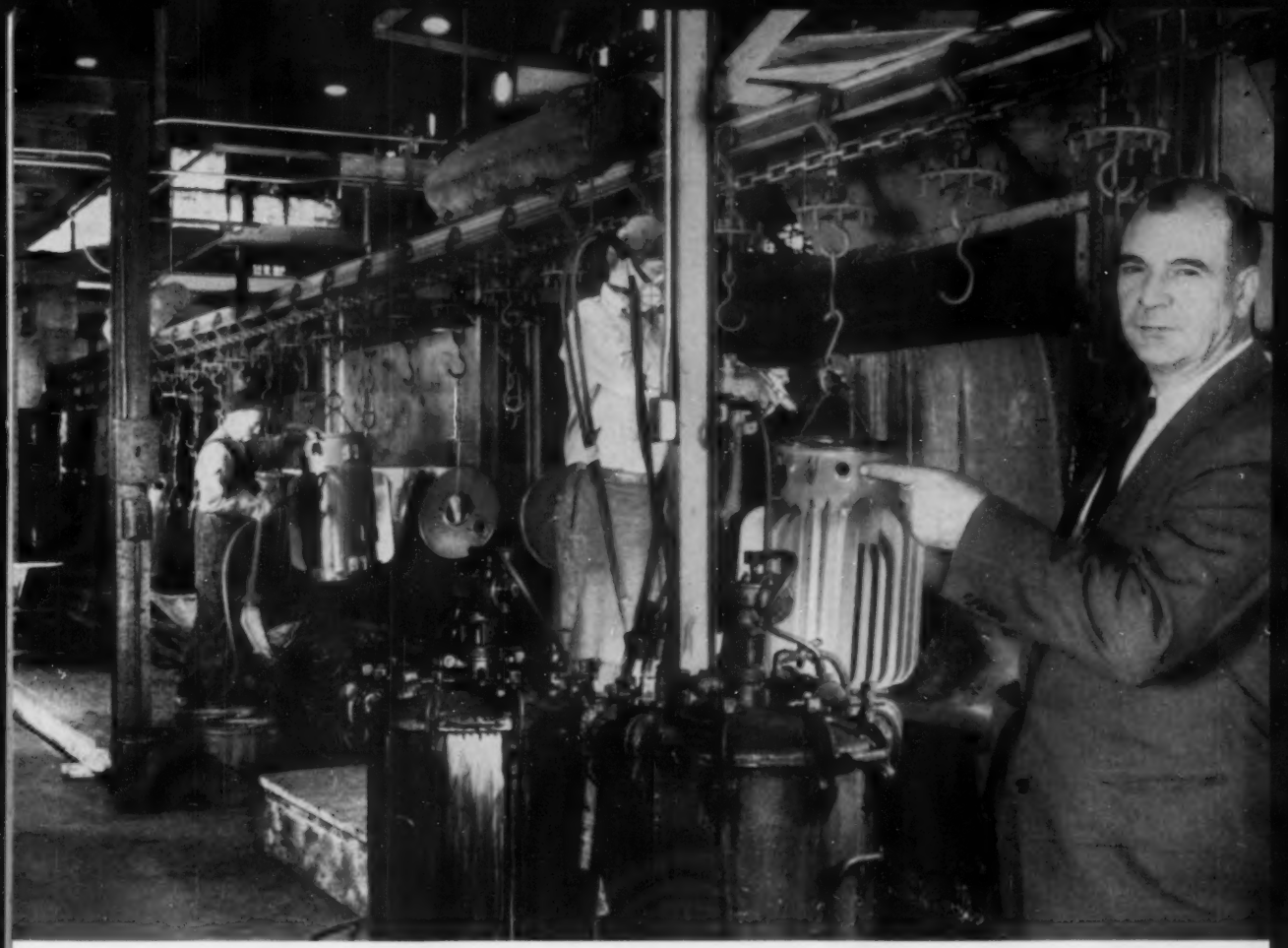
The industry, at least the producing end, is not oblivious to the danger from rising prices. Last August, Frank R. Milliken, Kennecott Copper Co vice president, warned in a talk at Salt Lake City, "Increased costs, price fluctuations, and artificial shortages (of copper) can only lead to increased use of substitute materials, and labor and management can not ignore this basic conclusion."

Break in Copper Situation Seen

On the other hand, Jean Vuillequez, vice president of American Metal Co, told a recent forum of the National Industrial Conference Board that the present shortage of copper is nearly over. He inferred that prices might come down. Vuillequez contended that world consumption of copper by 1965 would be 4.5 million tons compared with 3.4 million tons in 1954. With the end of shortage in sight, he said, copper producers will have to act to protect their markets and to build new ones.

The complexity of the copper picture stems from a number of factors:

- World-wide demand.
- The boom in the U. S. and abroad.
- The difference between domestic and foreign prices.
- Reluctance on part of some producers to open low grade mines.



Jim Ford, Manager, Materials Engineering, Transformer Division, explains this

FACT: Coastal Finish clinches corrosion resistance of new transformers

Coastal Finish touch-up paint . . . now available in easy-to-use spray can

Exclusive Coastal Finish plus the elimination of all vulnerable hardware on the new Westinghouse pole-type transformer solves your corrosion problems. Tests, subjecting transformers to 10,000 hours' saturated salt spray, prove that Coastal Finish lasts twice as long as ordinary paints. It also sheds the destructive effects of acids, alkalies, oxygen and ultraviolet light.

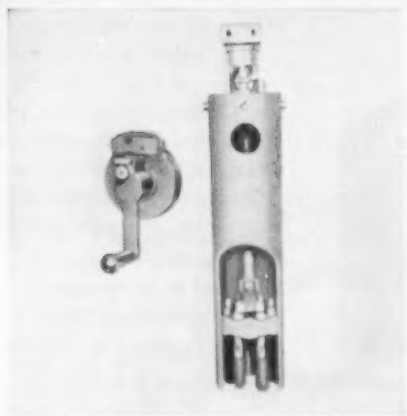
Twice the protection means twice the maintenance savings—with this new line of Westinghouse transformers.

• • •

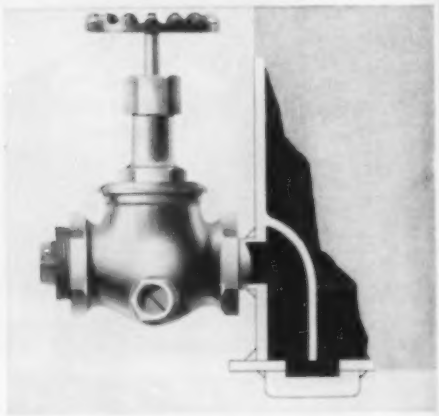
Facts can be demonstrated . . . call The Man With The Facts, your Westinghouse Sales Engineer, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-70746

YOU CAN BE **SURE**...IF IT'S

Westinghouse



WSB tap changer—one tap change with each revolution of operating handle.



Drain valve arrangement—assures complete drainage, damage protection.

Improvement program builds extra value into standardized power transformers

Simplified installation, reduced maintenance, improved performance—these are the results of the broad-scale improvement program for Westinghouse standardized power transformers. Here are some outstanding examples:

Instrument and accessories—more readily accessible, easier to read from any angle, completely protected by tank braces.

Four-way sled runner base—for easier handling. Cast steel lugs welded to the base prevent digging into wooden rollers—provide means for attaching towing cables with a standard clevis.

New valve arrangement, combined with tank sump, assures bottom sampling and complete oil drainage. Valve is placed above tank base for protection in shipping and handling and to avoid interference with tank welds.

New RJ bushing for voltages 15 kv and below. Features a flange rolled into two grooves cut in the porcelain and sealed by silicone rubber gaskets. So supported, bushings cannot crack due to uneven tightening in assembly or from stresses of normal operation. ASA standard bushings furnished for voltages above 15 kv.

WSB tap changer, now provided on all standardized power transformers, insures proper centering of contacts through a Geneva gear action requiring one complete revolution for each tap change. Button contacts are self-cleaning—arranged to provide parallel current paths to obtain maximum contact pressure during fault currents.

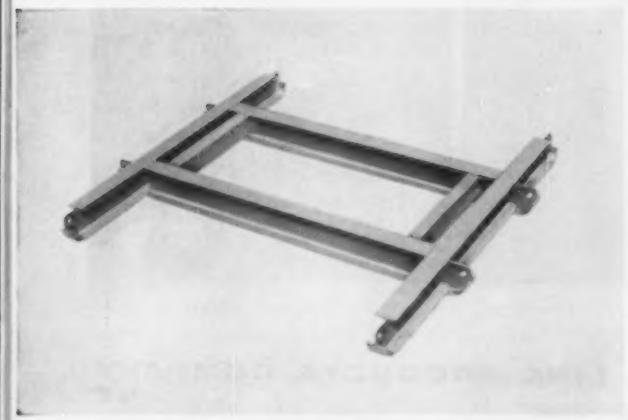
"Coastal Finish"— now used on all standardized power transformers. Provides an armor coat of mica flakes that insures complete protection under all operating conditions.

For still more dollar-saving details on Westinghouse standardized power transformers, call your Westinghouse sales engineer or write for B-5914, "Standardized Savings", Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pa.

J-70750

YOU CAN BE SURE...IF IT'S

Westinghouse



4-way sled runner base—simplifies handling, provides means for attaching towing cables with a standard clevis.

RJ bushing—rolled flange design prevents cracking in installation or from stresses of normal operation.

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use PREFORMED LINEGUARDS*

get ample protection for urban distribution at

Reduced Cost!

● Preformed Line Guards will save money on short-span urban distribution lines . . . whether ACSR, all-aluminum, or copper conductors are in use. Use them on all conductors where protection against vibration damage is not essential and standard Armor Rods may not be needed. Line Guards are smaller in diameter —fit insulator grooves of both old and new designs.

Check P L P price lists. You will notice Line Guards are *lower* in price than Armor Rods . . . yet, Line Guards provide sufficient protection on short spans.

Line Guards . . . developed from Armor Rods —are used like Armor Rods . . . protecting conductors against arcover, chafing, and mechanical wear due to concentrated stresses on light or short-span construction.

Let your P L P Representative help you select the most economical P L P Product for your application. Write or call Cleveland: EX 1-3571

**Made in accordance with or for use under one or more of the following U. S. Patents: 2,275,019; 2,587,521; 2,609,653; 2,691,865; other patents pending.*

Pin Insulator

Line Guards should be used over the conductor where tie wires are applied . . . guard against tie-wire damage.

Line Post

Line Guards permit you to apply your ties as tightly as needed without fear of conductor damage.

Clamp Type

Line Guards fit snugly . . . cushion the conductor from clamp-pressure damage and concentrated stresses.

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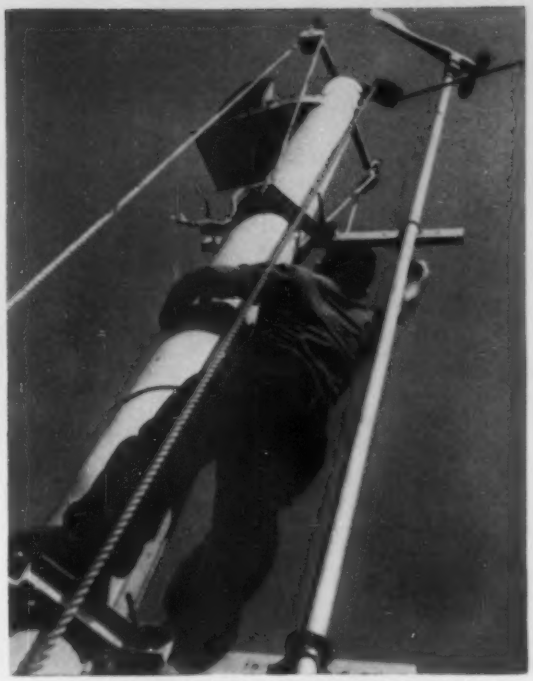
5349 St. Clair Avenue
Cleveland 3, Ohio

DUQUESNE LIGHT EXCAVATES, LAYS FOUNDATION

Two Utilities Push Atom Plant Progress



N. Y.'S CON ED MAKES PRELIMINARY WIND STUDIES

Progress reports for two atomic power plants were made recently by Duquesne Light Co, Pa., and Consolidated Edison Co of N. Y., Inc.

Duquesne Light Co's Shippingport installation, heralded as the nation's first full-scale atomic power plant, was revealed to the press in the foundation-laying stage (above left). Visiting newsmen, on the first inspection tour of the plant, reported that a concrete foundation, seven ft thick, was being poured. About 15,000 cu yds of concrete will be required for the foundation alone and 50,000 cu yds for the entire plant.

The 100,000-kw generator will deliver electricity to Duquesne's power system. Located 25 miles from Pittsburgh, the plant is being built by the utility in cooperation with the Atomic Energy Commission. Westinghouse Electric Corp, under AEC contract, is constructing the reactor (EW, Sept. 12, p 22).

Consolidated Edison Co of N. Y. announced that weather studies were under way preparatory to actual construction of its atomic plant on the Hudson River. New York University will make the studies for the utility.

Irving Karmin, associate engineering scientist at NYU, is shown above right installing an anemometer atop the mast of a ship anchored across the river from the Indian Point plant site.

In addition to measuring wind speed with anemometers mounted on the Maritime Administration's "mothball" fleet anchored in the Hudson, a 300-ft tower will be erected.

Smoke will be piped to the top of the tower and allowed to disperse under differing weather conditions. The tower will be equipped with various research instruments.

"This particular region has complicated wind structure," said Ben Davidson, NYU meteorologist who will direct the weather studies. "The steep wooded Ramapo mountains to the west and flat land to the east make the local wind pattern irregular and difficult to predict. The study is required to determine the stack height necessary for proper dispersion of stack exhausts."

County Approves Right-of-Way for Ohio Power Co Line

A three-year controversy over Ohio Power Co's proposal to fill a six-mile transmission-line gap in Franklin County ended recently when the county commissioners finally approved a right-of-way amenable to all.

The commissioners' ruling deviated from both the utility's original proposal and from the master plans of two townships, Belden and Plain. The utility estimated that the change in plans "will cost about a half-million dollars," although a great portion of present installation be salvaged.

Controversy had flared because the proposed line would have crossed a high-cost residential section as well as forest lands valued for their recreational possibilities. The right-of-way finally approved skirted both areas.

In 1952 when Ohio Power began constructing its line, a property owner in the path obtained an injunction on the ground that the line did not conform to a zoning plan approved by the County Commissioners.

A legal battle ensued. And the Ohio Supreme Court eventually held that the utility's plan must be approved by the county commissioners.

J. E. Stone, Jr. of Mississippi Power shows flannel board presentation for one of popular lectures, "Keystone of Freedom"

Utility Outlines Socialism's Dangers . . .

MANAGEMENT
Public Relations

to audiences in its service area. Mississippi Power Co finds people asking for encores as it campaigns against indifference

DON McCULLOCH, Supervisor of Advertising and Publicity, Mississippi Power Co, Gulfport, Miss.

Only by their own indifference will Americans become slaves of a government designed by its creators to be the servant of the people, Mississippi Power Co tells audiences in its service area. The utility company has effectively assumed the obligations of corporate citizenship by attacking this indifference. The flood of invitations for repeat performances testifies to the public approval of what the company is doing and the consequent good will it is gaining.

At a time when the entire power industry is under attack from the advocates of government ownership, Mississippi Power spokesmen are citing the dangers of Communism-Socialism. They are telling Mississippians that government ownership and Communism-Socialism are sprung from a Common Marxian matrix. They are stressing the vital but often neglected truism that there can be no freedom without proprietorship.

Two scripts, each edited for about 30-min presentation, are being employed by the company's spokesmen. These, with their accompanying visual aids, were prepared in conjunction with Freedom Forums at Harding College, Searcy, Ark. The material is available to any organization through the college's National Education Program.

One script, "This Is Our Problem," cites instances of nations that attained historical importance under freedom but fell after their rulers attempted to provide greater benefits to more people through and by the central government. Ancient Greece and Rome and modern Great Britain, where some rectification is now taking place, are the examples.

This script points out that Communism and Socialism have a common goal, absolute control of the people by a central government, and that Communists and Socialists are tireless in promoting their objective in this country today.

The other script, "Keystone of Freedom," describes the Plymouth, Mass., experiment in communal living. This experiment, it points out, was a failure

This IS OUR PROBLEM
National Education Program
HARDING COLLEGE
Objectives
1 Identify SOCIALISM-COMMUNISM
2 Point out SUPERIORITY OF THE AMERICAN WAY OF LIFE
3 Understand THE AMERICAN WAY OF LIFE
4 Preserve THE AMERICAN WAY OF LIFE

HOLLIS F. BROWN delivers talk, "This Is Our Problem." It cites cases of nations which have collapsed when Socialism took hold

because an ownerless society had no incentive to produce. Efficiency and prosperity came to the first New Englanders only after they became owners. Such ownership, the script avers, is natural, necessary, and Christian.

During the program's first year, the speakers were a young engineer in the distribution department and a young man in the advertising and publicity department. They made more than 50 appearances before a total of more than 5,000 people. The speakers are volunteers whose expenses are paid by the company, and they are available to any groups requesting them—service, social and women's clubs, schools, church groups, PTA's, lodges, and chambers of commerce.

Originally confined to the company's Gulf Coast division, the program has recently been extended to all divisions. It has been presented to audiences ranging from a mere seven to more than 800. On at least two occasions it was presented at regular church services in lieu of the sermon. It has been received enthusiastically within Mississippi Power's service area and has aroused so much interest outside the area that the company is in receipt of requests for its presentation from Louisiana, Alabama, Florida, and even Wisconsin.

Typical of its acceptance is what one listener wrote the company: "You are doing a job that needs to be done throughout the U. S."

His enthusiasm was seconded by a school principal, who wrote: "This is the type of presentation that we need in our schools."

Mississippi Power has wisely organized its presentation and equipped its spokesmen with visual aids. An important adjunct to the speaker's address is the use of a flannel board for keynoting the ideas as they occur in the oral presentation.

The flannel boards are made in two sections and when assembled measure about 3 by 4 ft. A heavy wire rack on the back of the board can be swung out and used as a support. The board is covered with a black flannel cloth. The cardboard symbols used by the speaker are backed with nylon flocking. As nylon and flannel have an affinity for each other, the symbols stay where the speaker places them. The boards cost $25 each.

The program has afforded younger employees of Mississippi Power a practical education in speaking to audiences of all descriptions. It has taught them to think on their feet. It has given them confidence in their own ability to present ideas in public. In accomplishing these, the program has provided the company with an effective public relations staff and forum.

Furthermore, the program has provided interesting and stimulating sessions for many organizations among whose membership Mississippi Power has made many loyal friends. It has publicized the philosophical basis of the industry's stand against that creeping Socialism that would have the government gulp down the people's power facilities.

These gains are being chalked up at an expense so small every electric utility can afford such a program.

MEETING REPORT

Utility Industry Survives . . .

. . . as part of the private enterprise system because of the regulatory authorities, H. Lester Hooker tells PUAV meeting

Regulation of private utilities in this country has been the foundation on which our private enterprise system rests. This theme pervaded the annual meeting of the Public Utilities Association of the Virginias, Sept. 16-17, White Sulphur Springs, W. Va.

H. Lester Hooker, chairman of the Virginia State Corporation Commission, said that because we have been able to retain our utility industries as part of the free enterprise system indicates "a most persuasive degree of success for the American brand of utility regulation."

Regulation Satisfies Public

On the other hand, he said, other countries for the most part have not been as successful. It might be a fair question to ask, he continued, whether regulation of utilities as it developed in other countries did not have at least a contributory effect in bringing about the greater amount of public ownership we see in such countries.

This might indicate, he said, that regulation of public utilities as it has developed in this country might have played its part in keeping our people satisfied with a continuation of public service under a system of private enterprise but subject to regulatory control by the government.

Take away or destroy commission regulation, Francis X. Welch, editor of Public Utilities Fortnightly magazine, warned, and you will have government monopoly.

Better Understanding Needed

He suggested doing something about obtaining better understanding and acceptance of commission regulation now, while there is time and opportunity to hold on to that which has proven itself. This means, he continued, to improve the public relations of regulation itself.

It is not enough, he continued, to tell our employees, our investors, and the consuming public what regulation is and how it works. We have got to be sure that:

1. Somebody is listening.

2. Somebody interested is listening.

3. There is some good reason why they should listen.

4. The information is getting across accurately at least in a general way.

Public Ignorant of Regulation

You will agree, he said, that a good many utility customers do not know what commission regulation is. They seem to think that the utility charges as much or as little as it pleases, without outside interference. A good many are convinced that rates are too high. Others may not even know, when asked, what their particular rate is, but they are sure it is too high, he declared.

If the story of regulation and how it works were fully understood by enough people, the electric utilities would not have to cope with such unfair and discriminatory policies as tax exemption or subsidies for politically operated services, he concluded.

Sell More Appliances

Get out and sell more electric appliances, especially water heaters and heat pumps, suggested Paul S. Brooks, vice president of American Gas & Electric Service Corp.

Electrical manufacturers, he said, "tell us they don't make money on water heaters." The reason is we are not selling enough to make it interesting. Also, he said there are too many different rates applying to the use of these heaters, requiring the manufacturer to make too many different models. It is about time, he said, "to standardize on the size elements and tanks."

Heat Pump Future Cited

The greatest opportunity for the future, he said, is the sale of the heat pump. He cited AG&E as an example. He said that 3,000 heating customers in the system were billed during the past heating season on an average of 19,000 kwhr annually. This compares with the average annual residential use of 2,868 kwhr in the system, he said.

FPC Rejects Application to Rehear Hells Canyon

The Federal Power Commission has rejected an application for rehearing of its order licensing the Idaho Power Co to build three dams in the Hells Canyon reach of the Snake River forming the Oregon-Idaho border.

Proponents of a single, federally financed high dam had petitioned for the rehearing, a routine move following FPC decisions (EW, Sept. 12, p 10). The National Hells Canyon Association, eight Public Utility Districts of Washington, and the National Rural Electric Cooperative Association had sought the action.

The FPC turned down their request to prevent any further action under the license until appeals have been concluded. The federal-dam proponents expect to take the matter to the courts.

"No new facts have been presented or alleged," FPC said, "and no new principles of law have been set forth . . . which either were not fully considered by the Commission before it entered the order or, having now been considered, warrant rehearing, recision, or modification of aforesaid order."

Power Policy Viewed in Perspective

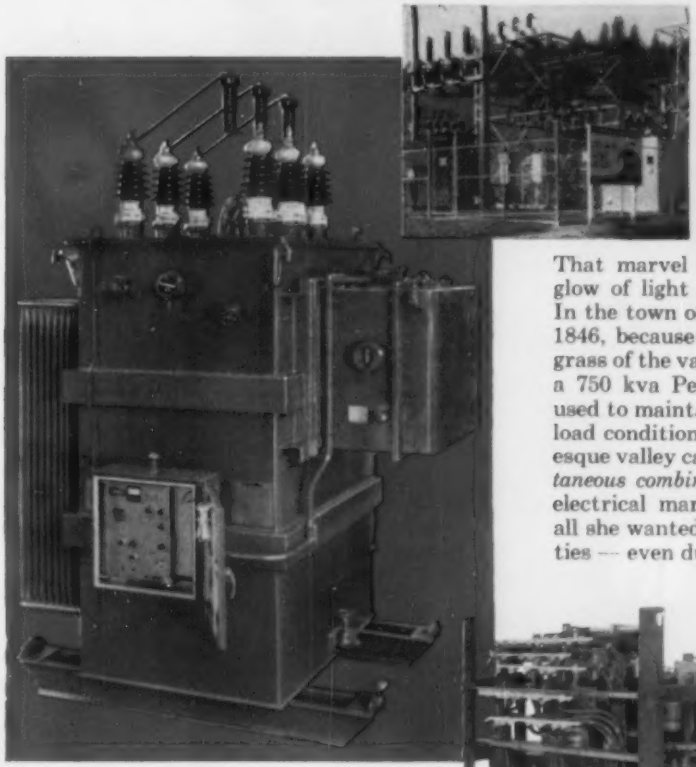
The following item appeared in the Wall Street Journal, Oct. 3 issue:

". . . Democratic legislators are trying to block the arrangement whereby the privately owned Idaho Power Co is to develop a dam site on the Snake River. They want the government to do it. And they have tried to blow up into a major issue the Dixon-Yates plan for sale of privately produced electricity to the TVA. But under Truman two similar TVA contracts were made without anyone getting excited about them. In addition the private utility industry grew even during the long period of the most violent New Deal attacks upon it; and utility shares came back into investment favor while Truman was in office."

If Alice passed through LOOKINGGLASS tonight . . .

her way would be lighted with uniform voltage regulated by this 750 Kva

Pennsylvania Step Voltage Regulator

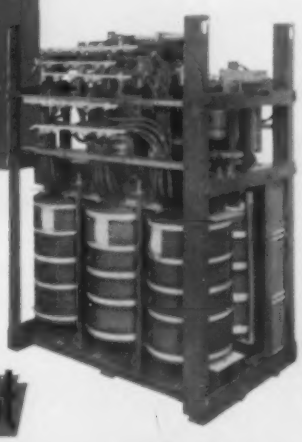


If Alice were to pass through Lookingglass tonight, she would see that many changes have been made since her famous nineteenth century trip to the land of topsy-turvy. One particularly marvelous sight would be found just about everywhere: in the streets, in homes, in stores, in barns.

That marvel would be the steady, never-flickering glow of light produced by *well regulated* electricity. In the town of Lookingglass, Oregon — so named, in 1846, because the reflection of the sun in the green grass of the valley created a mirror-like impression — a 750 kva Pennsylvania Step Voltage Regulator is used to maintain an even voltage throughout varying load conditions. As a result, residents of the picturesque valley can enjoy to the fullest extent *any simultaneous combination* of lights, appliances, and other electrical marvels. Alice could toy and experiment all she wanted to with present day electrical curiosities — even during the peak load hours of the day.

Similar Pennsylvania Step Voltage Regulators are performing identical jobs in many communities throughout the United States — helping to transform this country into an electrical Wonderland from coast to coast.

With this 750 kva Pennsylvania Step Voltage Regulator, the Bonneville Power Administration (U. S. Department of Interior) maintains an even flow of voltage for the Douglas Electric Cooperative, Inc., which serves the Lookingglass Valley and adjacent areas. The unit provides 34,500 volts at a rated current of 125.5 amperes. It is equipped with an automatic load tap changer for plus or minus 10% voltage regulation in thirty-two ⅝% steps. (Three phase, 60 cycles, 55°C. rise, OA-outdoors.)



This internal view of the 750 kva Pennsylvania Step Voltage Regulator shows the exciting transformer, in the foreground, and one coil of the series transformer. Note the rigid supports of the LTC tap leads, and the rugged framework which permits the entire internal assembly to be handled as an integral unit.

PENNSYLVANIA TRANSFORMER COMPANY

A McGraw Electric Company Division • **CANONSBURG** • **PENNSYLVANIA** *Greater Pittsburgh District*

DISTRIBUTION
TRANSFORMERS
ATANA*

2. SEALED AGAINST MOISTURE—
NITRILE RUBBER GASKETS

1. FLAWS SCREENED OUT—
CHECKED BY IMPULSE TEST

3. MADE TO RESIST CORROSION—
STAINLESS STEEL BANDS & HARDWARE

4. STRONGER TERMINALS—
MADE OF STRENICOR

See for yourself—four reasons why G.E. gives

EXTRA-LONG SERVICE LIFE

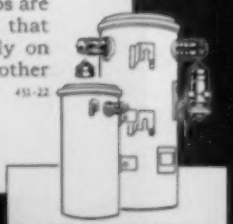
How long will a distribution transformer last? No one knows precisely, but we do know that a General Electric transformer should last longer because:

Flaws are screened out by a production-line impulse test. Each transformer 50 kva and below receives this extra precaution which assures you transformers with longer life.

Sealed against moisture, even after years on a pole in the rain. Only G-E transformers have nitrile rubber gaskets. They seal out all contaminants, resulting in longer life.

Designed to resist corrosion. The one-piece cover band and associated hardware are made of stainless steel. They're more expensive to make, but contribute to longer life.

Less terminal breakage since clamps are made of Strenicor—a special alloy that resists season cracking. Available only on G-E transformers, Strenicor is another feature giving longer life.



CONVENTIONAL—SELF PROTECTED
take your choice
General Electric makes both

*ATANA. An important reason why *All Transformers Are Not Alike* is the fact that G-E units give extra-long service life. General Electric Company, Schenectady 5, New York.

Progress Is Our Most Important Product

GENERAL ELECTRIC

MEETING REPORT

PEA Looks Ahead at Annual Meeting

. . . Where Business Leaders and Economists Predict Continued Growth

"No matter how high we raise our sights, they will probably be too low. We are today on the threshold of the atomic age. Among the scores of probable benefits . . . is the strong possibility of a far longer peace than the civilized world has ever known."

Thus did Board Chairman H. P. Liversidge of Philadelphia Electric Co keynote Pennsylvania Electric Association's annual meeting at Philadelphia, Sept. 20-21. In this future Liversidge saw "an era of tremendous expansion . . . necessitating ever-larger increases in capital investment." And it will present these four major challenges to electric utilities:

1. To make service as perfect as possible under all conditions.

2. To design and engineer system expansion for economy and reliability.

3. To attract and retain qualified manpower.

4. To obtain the maximum good will of employees, consumers, investors, and the public.

American contributions toward economic stability and world peace, advised General A. C. Wedemeyer, vice president, Rheem Manufacturing Co, should recognize that the United Nations is still an international forum. He urged elimination of "unnecessary involvement in affairs of other nations" and aiding only nations "which are firmly committed to and loyally support our goals in the international arena."

ECONOMIC OUTLOOK REMAINS FAVORABLE for utilities, reports Dr Jules Backman, N. Y. University economist

The long term outlook is bright for American business, predicted Dr Jules Backman, New York University. Business is at a record high and should show little change during the next six months, he added. Rebuilding of inventories and the prospect of a tax cut in 1956 will continue to stimulate the economy.

For electric utilities, Dr Backman saw unabated sales growth in 1956. And expansion to double capacity in a decade will require large amounts of additional capital. To attract this capital, earnings must be kept healthy.

Trends of utility growth were projected by Fischer Black, publisher and editor, Electrical World. Starting with 1955 which he called "the industry's record growth year," he evaluated the influences which assure continuation of the rate of growth. Sales in the decade ending with 1960 will show 138% gain and the following decade, 88%, he predicted. Sales of 475 billion kwhr in 1955 will rise 8% in 1956, followed by 3% in 1957. By 1970 they should reach 1¼ trillion.

Annual capital expenditures may drop slightly in 1956 but should double 1955's $3.9 billion by 1970. Transmission and substation expenditures should continue at about present levels but trend toward $1 billion for 1970. But "distribution will never go in any direction but up."

"More plant means more maintenance," warned Black, predicting that requirements by 1970 will be 2½ times today's $621 million.

In this future bituminous coal will remain the most important fuel, contended G. H. Love, president, Pitts-

(*Continued on page* 24)

AWARD FOR LOWEST ACCIDENT FREQUENCY, 1.77 per million manhours, is presented by President McQuiston to K. G. Cregar, Metropolitan Edison Co. Cregar also accepted awards for greatest improvement and reduction of shocks

NEW S&C Time-Current Curves to Simplify Fuse Link Selection

These new S&C Time-Current Curves provide information on how to achieve precise co-ordination, and how to obtain the maximum number of protection points on your distribution system.

With recommended applications and specific tolerances, these curves for S&C Positrol Fuse Links (including the EEI-NEMA K-speed) give valuable aid in selection of the proper speeds and ampere ratings.

Also available is Data Sheet 600 containing information on adjustments for preloading, which is important where co-ordination involves (1) high precision, (2) oil circuit reclosers, or (3) links preloaded beyond their ratings.

WRITE TODAY FOR TCC FOLDER 550 AND DATA SHEET 600

Specialists in High-Voltage Circuit Interruption since 1910

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POWER FUSES • DISTRIBUTION CUTOUTS AND FUSE LINKS • LOAD INTERRUPTERS • METALCLAD SWITCHGEAR

burgh Consolidated Coal Co. Utilities have become the greatest users. And despite prediction of 4 million kw of atomic capacity by 1965, consumption of coal for production of electricity will grow.

Utilities, as the major users, must make long-term arrangements with coal producers to enable them to establish modern mines, said Love. Automation will take three years to install and require $15 million investment to produce 3 million tons annually. Most of earnings are being ploughed back into improvements and research to make coal a cheaper fuel.

Utilities and the coal industry must join the railroads in a three-way partnership to achieve the mechanized mass production and economical train-load delivery of coal to efficient modern power plants, proposed Love. Mining improvements have held coal costs in line and contributed to the present low production costs of electric energy.

Conservation of coal has been a continuing achievement in utility steam plants, according to historical statistics presented by R. G. Rincliffe, president, Philadelphia Electric Co. He predicted that the next major gain will come with supercritical pressure steam which will be applied in Philadelphia's new 325-Mw Eddystone unit (EW, Aug. 30, 1954, p 6; Nov. 15, 1954, p 114).

Utility managements must devote more attention to employees, giving them sincerity, courtesy, and a boss who gets results, advised Management Consultant Fred Smith. Each employee is still an individual, basically an optimist, and has a sense of fair play. Smith predicted that "the next advance in management will come when managements learn to call them into meetings and talk to them."

R. P. LIVERSIDGE, J. O. CHAMBERS, O. E. FLORA, OUTGOING PRESIDENT T. O. McQUISTON

PEA Elects Officers at 48th Annual Meeting

Orville E. Flora, secretary and treasurer of Pennsylvania Power Co, was elected president of Pennsylvania Electric Association at 48th annual meeting held in Philadelphia.

Vice presidents named were: Robert P. Liversidge, vice president of Philadelphia Electric Co; Joseph O. Chambers, vice president, West Penn Power Co; and George M. Keenan, vice president, Pennsylvania Power & Light Co.

Orville E. Flora began his utility career with a predecessor company of Ohio Edison Co. In 1931 he joined Pennsylvania Power as secretary and treasurer and was elected a director in 1944.

Robert P. Liversidge became associated with Philadelphia Electric in 1932 as an engineering assistant. After holding posts of assistant general superintendent of station operations and assistant manager of electric operations, he was named vice president of operations in 1952.

Joseph O. Chambers started with West Penn Power as a serviceman in 1922. He was made assistant commercial manager in 1931 and commercial manager three years later. Elected vice president in 1949, Chambers now heads industrial relations.

George M. Keenan joined a predecessor of Pennsylvania P&L in 1918. Progressing through the operating engineering and commercial sales departments, he became general commercial manager. He was named chief engineer in 1944 and vice president of engineering in 1948.

GENERAL SESSION SPEAKERS included O. B. Falls, General Electric Co; J. L. White, Appalachian Electric Power Co; L. V. Sutton, Carolina P&L Co; N. A. Cocke and O. J. Miller, Duke Power Co; and Chairman Miles Cary, Virginia E&P Co

Southeastern Electric Exchange Told . . .

Automation Must Proceed Slowly

Utilities must approach application of automation with care lest they replace men with machines faster than the displaced workers can be absorbed in other jobs. This warning was issued by T. A. Fearnside and A. W. Goldman, Stone & Webster Engineering Corp, at the Engineering and Operation Section meeting of the Southeastern Electric Exchange.

Welfare of utilities, they pointed out, is closely tied to the welfare of the communities they serve. Therefore, in adopting the fruits of automation the utilities must follow dictates of a sterner conscience regardless of technological development.

Utilities should adopt a program for supplying employees with information to combat the threat of socialized power, said N. A. Cocke, president, Duke Power Co. Such a program should be headed by a responsible man who can devote considerable time to careful preparation of material in simple language and to clear presentations.

"We've been on the defensive," said Cocke. "We should take the offensive." If all companies embark on such a program, it will be a great success.

Need for action against socialized power was also urged by L. V. Sutton, President, Carolina Power & Light Co. He outlined the growth of TVA and pointed up the threat in present proposals that permit TVA to issue revenue bonds or lease purchase municipally built plants.

O. B. Falls, General Electric Co, predicted that by 1975 the annual kilowatt additions of nuclear-powered stations will be twice the present annual generating additions. By 1980 it will be four times the present figure.

The atomic convention in Geneva, Falls said, showed that Russia has done more work than we had thought. Her scientists have done a considerable amount of highly qualified work and some calculations that our people have not, but which substantiate some of our work. We learned some things from them, he said.

Positionwise, Falls continued, Russia is at least up to and possibly a little ahead of England, which is not so far ahead as originally thought. This is because England is sticking to a single reactor design that produces plutonium as well as power.

An important part of any program for recruiting college graduates is the glamorizing of unsolved thought-provoking problems, said Walter J. Seeley, Duke University. These problems should involve research; design and operation of transmission, generation, and distribution and be presented by enthusiastic recruiters, including satisfied recent graduates.

Distribution

Shielding of 13.8-kv distribution circuits using the system ground has cut outages of New Orleans Public Service Co from 1.02 per 100 miles per year to less than 0.09 in the area that has about 70 thunderstorms annually, Morris G. West reported.

This was accomplished by relocating and installing the secondary neutral (system ground) either on a bayonet or on the top of new poles, having 5 ft additional height to provide a 45-deg shielding angle. All lightning arresters are valve type.

Effect on the system of 4.5-kw water heaters having interlocked elements is still controversial:

J. J. Strickland said Duke Power Co has concluded that the 4.5-kw water heaters increase the individual customers demand by 1 kw. However, the water heaters do not add appreciably to the distribution transformer load because of greater diversity resulting from a shorter heating time.

P. C. O'Shee, Alabama Power Co, said that preliminary tests indicate the new water heater adds to winter peak load, will result in greater energy use, but will not materially affect the daily system peak. However, the units will require more capacity per customer in distribution transformers, secondaries, and primaries. He further commented that "our residential areas are changing from a winter to summer peak, and . . . the distribution investment required to serve future summer peaks will be about all that is necessary to serve the winter peak with the 4.5-kw water heaters."

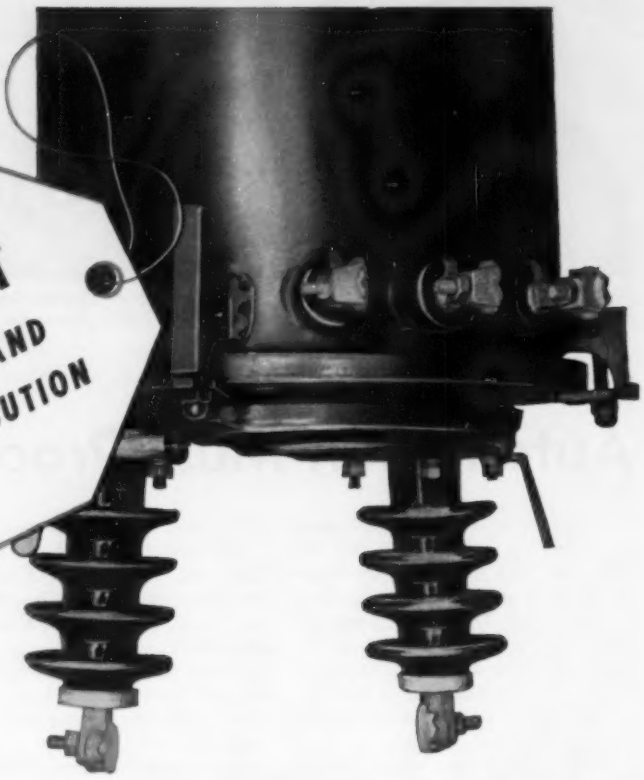
John Hunter, Carolina Power & Light Co, reported that their incomplete test results indicate that if all their water heaters (43.3% saturation) were 4.5-kw units, the individual distribution transformers would have to be 75% larger. Moreover, "the increased system demand would mean an additional generating unit."

Three approaches to the feasibility of remotely reading customer meters were outlined by Sabert Oglesby, Jr., Southern Research Institute. One involves transmitting a highly directional signal from a truck to a desired meter and receiving the return signal. Another possibility for reading meters re-

(*Continued on page* 27)

KUHLMAN UPSIDE-DOWN TEST

INSURES AGAINST OIL AND AIR LEAKS OF DISTRIBUTION TRANSFORMERS



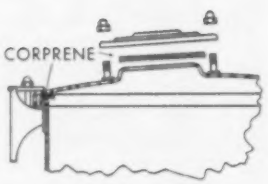
In addition to the thorough and exacting tests required by NEMA Standards*, all KUHLMAN Distribution Transformers up to 50 KVA receive a special upside down test, followed by a pressure test for air-tight, leak-free operation. First, the transformer is rotated 360° in a vertical plane to make sure there are absolutely no oil leaks, particularly in the vulnerable spots above the normal oil level line, where leaks are almost impossible to detect with the transformer in an upright position. Then a pressure test under simulated operating conditions prior to shipment provides a final check against oil and air leaks. Transformers above 50 KVA are pressure tested and checked for oil and air leaks with an electronic leak detector. KUHLMAN also spot tests all distribution transformers for impulse, audible noise, radio noise, and power factor in addition to NEMA requirements.*

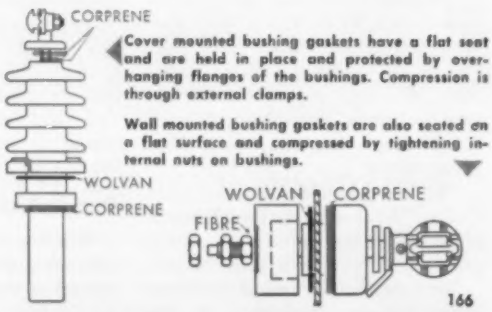
*KUHLMAN Distribution Transformers are tested as required by NEMA Standards for:

- winding resistance
- ratio
- polarity
- phase relation
- no load loss
- exciting current
- impedance
- load loss
- temperature
- applied potential and induced potential

Here is why KUHLMAN Distribution Transformers are air-tight, leak-free and moistureproof:

Cover and hand hole cover corprene gaskets are under constant uniform pressure insuring a permanent air-tight seal.





Cover mounted bushing gaskets have a flat seat and are held in place and protected by overhanging flanges of the bushings. Compression is through external clamps.

Wall mounted bushing gaskets are also seated on a flat surface and compressed by tightening internal nuts on bushings.

166

KUHLMAN

KUHLMAN ELECTRIC COMPANY, BAY CITY, MICHIGAN • CRYSTAL SPRINGS, MISSISSIPPI • SALINAS, CALIFORNIA

motely is the use of carrier current on power lines to interrogate selectively a group of meters having specified time delays. The third alternative is the use of separate lines or telephone lines and a central switching system for selectively interrogating meters and a central signal source for returning the meter reading.

The cheapest 12-kv line you should build is the best possible one, according to T. W. Tillman, Georgia Power Co. We would be much better off if the money wasted in labor and changing poles and lines could be put in taller poles and larger wire in the original installations.

To substantiate this view, Tillman cited the following problems when working the higher voltage:

1. Mechanical strength of wire makes hot-stick work hazardous.

2. Flashovers will result in more frequent burndown.

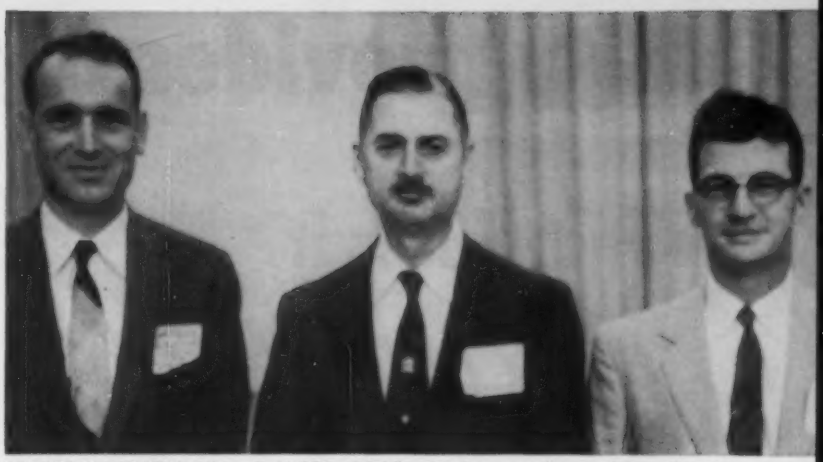
3. Lines must be de-energized to replace phase wires or add new wires.

Transmission and Subs

Rapid development of new substation equipment with more complicated parts and strict adjustment requirements have led Duke Power Co to divide maintenance and construction crews along specialized lines, G. G. Mattison and R. F. Dorton said. These specialized crews do both maintenance and construction work involving transformers, oil breakers, capacitors, switchboard and control wiring, and the like.

A discussion of substation grounding practice, led by E. P. Miller, South Carolina Electric & Gas Co, found most engineers in agreement on the effectiveness of deep ground rods in keeping down surface gradients. Two-ohms ground resistance or less seemed to be the agreed aim on most systems though all were not successful in achieving it. Most common method was a belt or loop of 2/0 cable with ground rods generally spaced on 15-ft centers. Lightning arrester ground leads are quite commonly connected to ground mats as are substation fence grounds, particularly when the spacing between the two systems is less than 15 ft.

Experience of the Alabama Power Co with its Jordan-Flomaton 110-kv line, which showed 33% pole replacement in 20 years and 51.6% in 29 years, has resulted in a pole specification preventing the rafting of southern pine prior to creosoting. It was established that poles for this line had been rafted down the river to the creosoting plant. The 1.14% average on yearly transmission pole replacements for the company amount to 50% of the number of original poles in 43.8 years, Wiley Johnson said.



REMOTE METER READING and shielding 13.8-kv circuits were discussed by Sabert Oglesby (l) and Morris G. West (r) with Chairman F. E. Johnson, New Orleans PS

Success with one-coat painting of steel transmission towers, begun in 1950, has lead Carolina Power & Light Co to shift from a 5-year to a 10-year painting cycle. An average of 163 towers are painted per year at a cost of $100 per tower when done with company forces; $78.18 when contracted out, J. N. Steed reported.

Calcium in the spray water used for chemical brush control may prevent effective absorption of 2,4,D-2,4,5T esters by some hard-to-kill waxy leaf brush species, Paul Borger, Georgia Power Co, reported. This may require sequestering with sodium meta phosphate (Calgon) to be effective.

Because of complexities of insurance and training, Mississippi Power Co does not use employees as either pilots or observers in the light planes that patrol its transmission lines. A private flying service, used since 1947, patrols 970 miles of line monthly at a cost of $16.75 an hour (47 cents per mile) for plane, pilot, and observer, W. J. Carr said. Monthly air patrols are supplemented by an annual climbing.

In discussing how to secure and organize data for an analyzer study, C. L. Gilkesore, Virginia Electric & Power Co, offered this advice: Advance planning is the key to success in a board study. An area analysis of loads and resources will prove most useful in defining the problem beforehand. Gather data carefully in advance; accuracy of an analyzer is no greater than the information fed it. The ideal study team should include 6 men: 1 familiar with system, 2 familiar in detail with the data; 2 idea men to draw up tests, and a young engineer in training to record readings.

Generation

A fire resistant fluid (XRL 265-A) shows promise of developing into a practical lubricant for turbines, according to W. C. Beattie, Consolidated Edison Co of New York. After 5,322 hours of actual operating service, the fluid was found to be a good lubricant, not so resistant to oxidation as double-inhibited oil, and satisfactorily fire resistant. However, the fluid foams excessively and is, therefore, not suitable for turbine lubrication. To make it serviceable, Beattie recommended that a reformulation or permanent foam inhibitor is necessary.

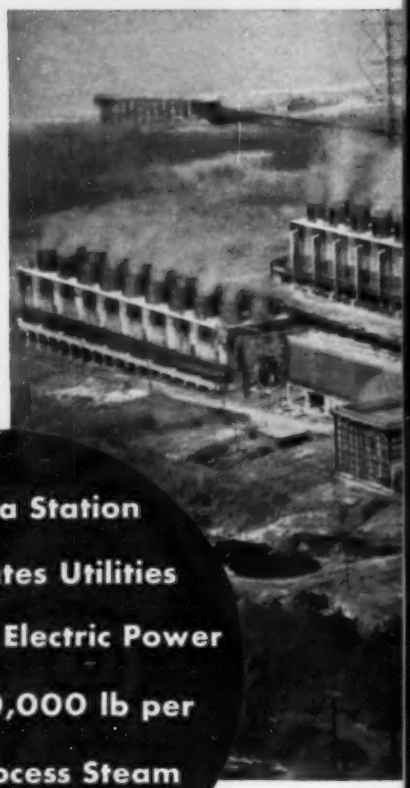
J. A. Stewart, Virginia Electric & Power Co, described experience with controlled quick starting of 60-Mw, 850-psi, 900F turbine-generator units following weekend shut downs. Three such starts showed that the practice of rolling for three hours can be cut to 1 hour, that the average loading rate of ½ Mw per minute can be increased without harm, and that the critical loading period is up to the first 20 Mw.

E. C. Fiss, Duke Power Co, reported success with the use of Hydrazine in boiler water to prevent oxygen corrosion of tubes. Use of Hydrozine was without undesirable side effects and does not require unusual equipment and techniques.

Utility provides both steam

This Fact Makes It *doubly important*

That Switchgear Provide Uninterrupted Power for Auxiliaries



Louisiana Station of Gulf States Utilities Co. Provides Electric Power plus 3,000,000 lb per hour of Process Steam for Industry

TWO lineups of Allis-Chalmers station auxiliary switchgear are used in this plant. Engineered by Stone and Webster, it is one of the largest steam plants in the United States. Since much of the process steam is supplied to refineries, the load factor is high and the need for continuity of service of the station auxiliaries is especially critical. Gas is used as the principal fuel.

There are 12 turbine-generators in the plant. This division of the load is, of course, an important factor in continuity of electrical service. In addition, the electrical schemes used assure an uninterrupted power source for auxiliaries.

There are 13 units in one of the lineups of Allis-Chalmers switchgear and 28 units in the other. A brief description of the new 28-unit lineup in the new plant extension will illustrate the planning employed.

The 28 switchgear units are made up into three bus sections, with each section controlling auxiliaries for a separate boiler.

Under normal operating conditions each bus section is energized by its respective transformer. Tie breakers between the sections are open.

But in the event of trouble any two of the three transformers can feed all three bus sections.

On each bus section there are: one boiler feed pump, two forced draft fans, and two induced draft fans. In addition, there is a fourth boiler feed pump on one bus section which can take the place of any of the other three boiler feed pumps. In the event of failure of either one of the two forced draft or induced draft fans, the remaining fans would enable the boiler to carry half its normal load.

Overcurrent relays on all feeders and bus tie breakers will trip and lock out associated circuit breakers and close an annunciator contact for alarm. Long time overcurrent relays are used on motor feeders.

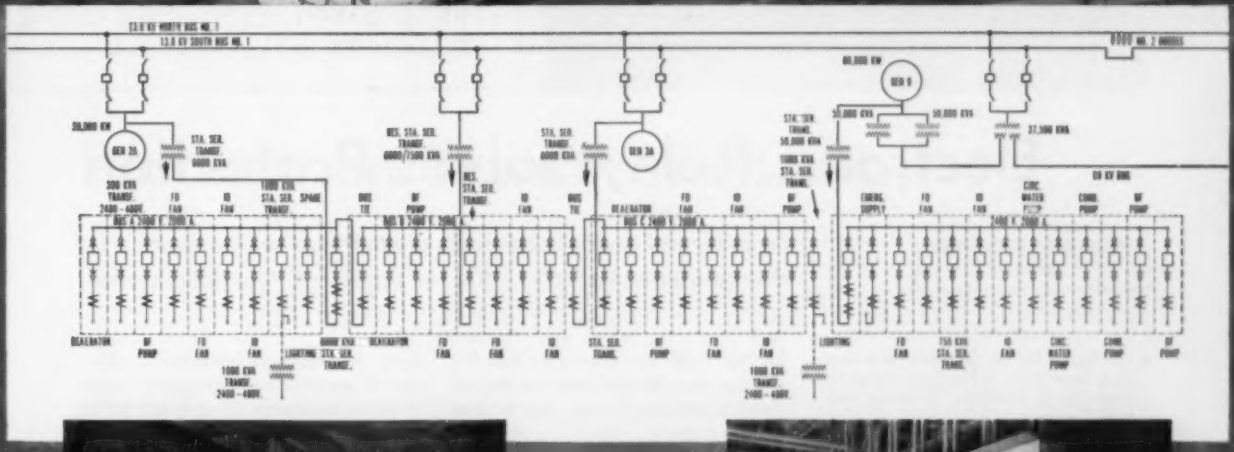
Interlocking in switchgear assures proper sequence of operation of auxiliaries.

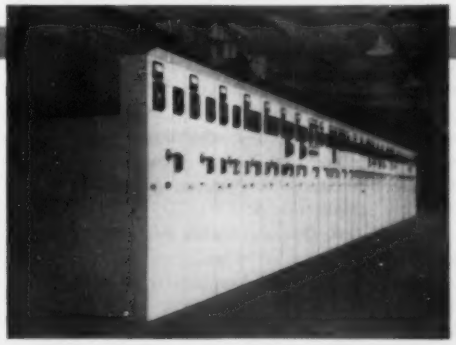
★ ★ ★

Allis-Chalmers engineers worked in close cooperation with both Stone and Webster and Gulf States Utilities Company engineers. This is one of many auxiliary lineups built by Allis-Chalmers. For information about Allis-Chalmers switchgear, call your nearby A-C office, or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-4791

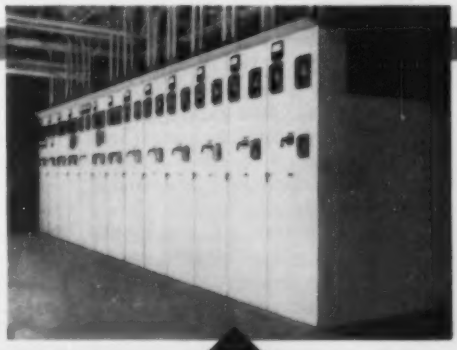
ALLIS-

and electricity for refineries





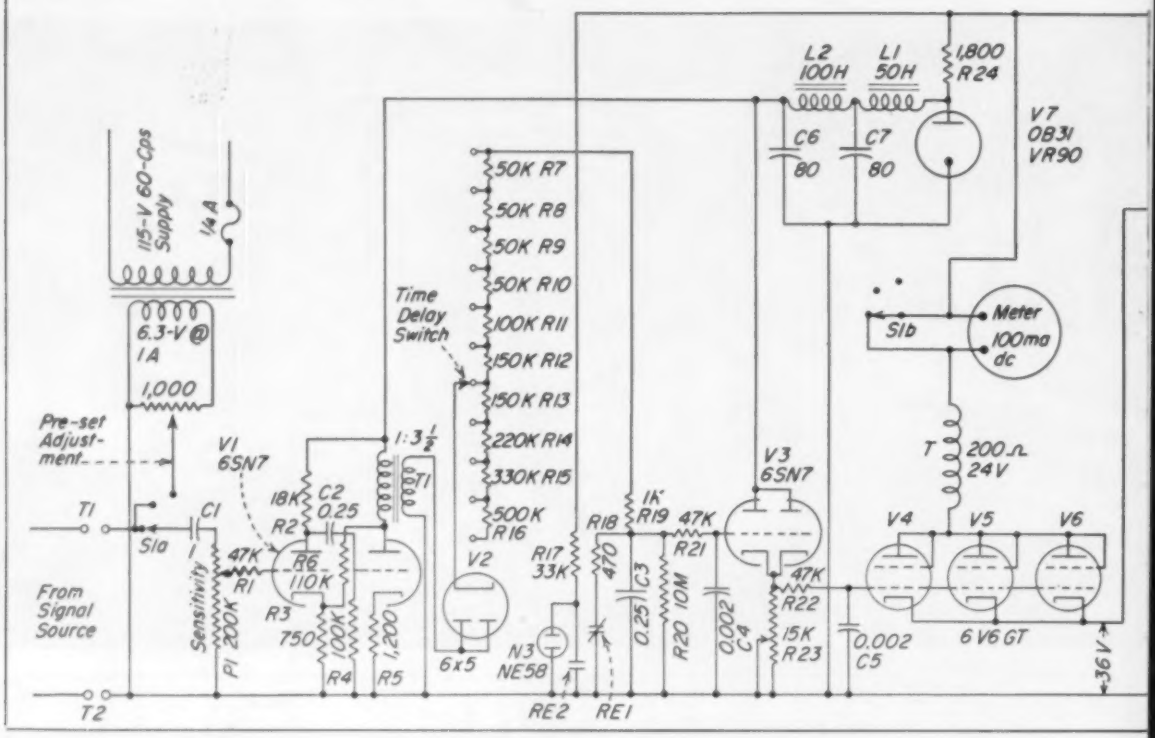
Special drip-proof design was furnished for both lineups of Allis-Chalmers Metal-Clad Switchgear.



CHALMERS

A-C ALLIS-CHALMERS

Fig 1 – Electronic Relay Schematic Diagram



Electronic Relay Solves Protection

RELAYING-PROTECTION
Design

Experimental device accelerates ground-fault relay operation to maintain unfaulted 66-kv line in service on Manitoba system

J. P. C. McMATH, Professor and Chairman, Department of Electrical Engineering, University of Manitoba, Winnipeg, Manitoba, Canada

An electronic relay has solved the Manitoba Power Commission's problem of keeping the unfaulted line in service when a fault occurs on one of two 66-kv transmission lines. These are delta connected (ungrounded) and form a loop feed to a remote distributing center.

As developed by the author with the assistance of the Commission's engineering and operating departments, the relay has these essential components: voltage amplifier section, adjustable time-delay section, cathode follower coupling section, and relay section. As illustrated schematically in Fig 1, it was developed for this specific experimental application, but many other applications may be possible.

The 66-kv lines are protected individually at their sending ends by a system of potential polarized high-speed directional ground-fault relays. To prevent tripout of the entire loop when there is a ground fault on either line, the loop tie breaker at the receiving end must open before the directional ground-fault relays at the sending end operate. This sequence of operations keeps the unfaulted line in service.

Installed capacitive coupling devices at the receiving end provide a ground-fault-indicating signal of about 2 v at 100μa from a grounded-wye broken-delta transformer connection. The special sensitive electromagnetic relay normally used with the couplers, however, was much too slow for the desired operation. High-speed voltage relays of usual design could not be actuated from such a low power source.

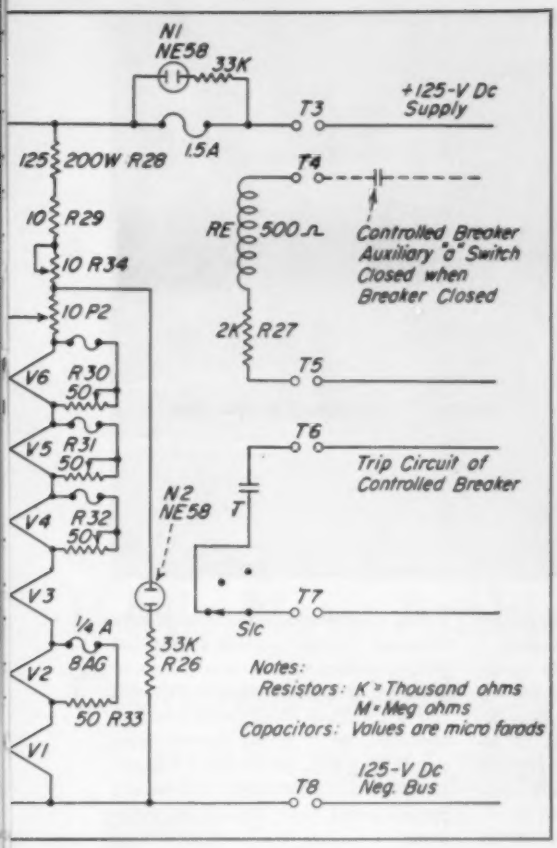
Accordingly, the commission decided to design and experiment with an electronic relay meeting these general requirements:

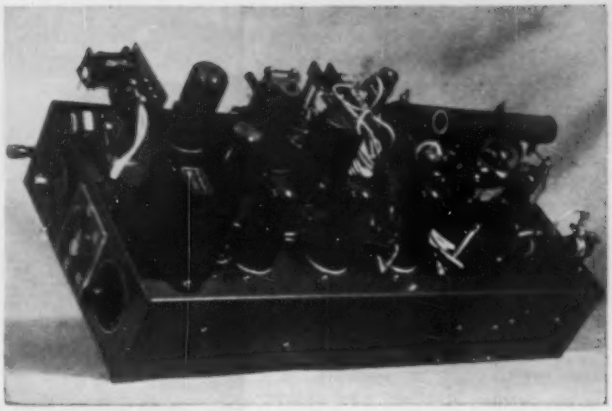
1. Operable from an input of less than 2 v at 100μa or smaller current.

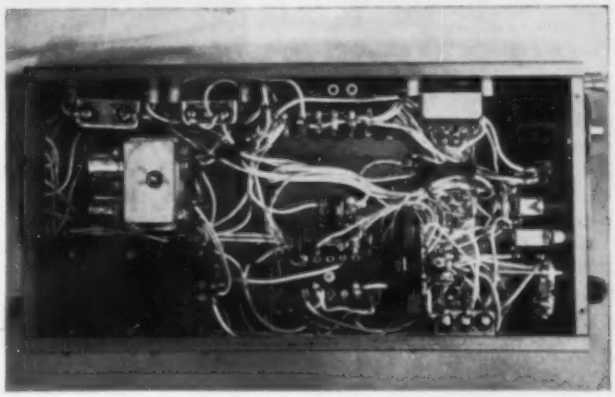
2. Powered entirely from the 125-v station control battery.

3. Capable of operating in three cycles and having adjustable sensitivity and time delay.

4. Rugged and reliable as possible.







TOP VIEW (above) and bottom view (below) indicate size of relay

Problem on Transmission Loop

Following considerable preliminary experimentation, the apparatus was built and put into experimental service in September 1953 and is still in continuous use.

The relay's low power-supply voltage necessitated a transformer, shown in Fig 1 as T 1. The transformer, having approximately 1:3.5 turns ratio, boosts output from the voltage amplifier section. Negative voltage feedback from plate to cathode (resistor R6) and negative current feedback in each stage (un-bypassed cathode resistor) stabilize the gain of the amplifier against variations caused by normal tube aging.

A positive dc voltage proportional to the amplifier output is obtained from the cathode of rectifier V2. That portion of resistance tapped off by the time-delay switch between the rectifier cathode and C3 forms with C3 an RC time-delay circuit, the delay obtained depending on the switch setting and the magnitude of the voltage at the cathode V2.

V3 is a cathode follower coupling stage between the time-delay section and the relay section. To minimize grid current effects occasioned by the 10-megohm R20 in its grid circuit, the heater of this stage is run at about 4.5 v.

Three paralleled 6V6 GT's, constituting the relay section, provide sufficient ample anode current at the low anode-to-cathode voltage available. For satisfactory operation, the trip relay requires 45 ma on its 24-v coil. When the tubes are new, about 75 ma is available, allowing a reasonable margin for tube aging.

R21 and C4, and R22 and C5 are filters for reducing the possible effect of transient voltage fluctuations. Their time delays are quite negligible. The two-section filter, consisting of L1 and C7, and L2 and C6, fed from the voltage regulator tube V7, effectively isolates the amplifier and time-delay sections from supply voltage surges caused by breaker tripping or closing. The breaker involved is not necessarily the unit controlled by this relay.

Tube heaters are in series (suitable shunting resistors being used where required) with a large voltage dropping resistor across the supply. This voltage drop across the tube heaters provides bias for the 6V6's. It provides sufficiently stable bias without use of a separate heavy bleeder which otherwise would be needed. As appreciable tube current flows through the bias circuit only when the relay operates, and then only for a few cycles and occasionally, any effect on the tube heaters is considered negligible.

"Reset" relay RE, having contacts RE1 and RE2, is de-energized only when the controlled breaker is open. When this breaker is open, contact RE2 is ordinarily closed and RE1 ordi-

narily open, leaving the time-delay section ready to operate normally. Without the reset relay, the breaker could not be closed after tripping until the charge on C3 has been dissipated by R20. As the time constant of the combination is 2.5 sec, about 10 sec would be required generally for return to "normal." Thus fast automatic reclosing would be impossible.

This reset feature is essential to the Manitoba Power Commission's system which is equipped with high-speed reclosing relays. In a tripping operation, the reset relay drops out, being energized through an auxiliary "a" switch on the breaker. The switch opens when the breaker opens. This action allows RE1 to close and almost instantly discharges the time-delay capacitor C3. When the breaker is reclosed, its auxiliary "a" switch closes and re-energizes the reset relay, contact RE1 opens, and the electronic relay is "reset."

Neon lamps shown in Fig 1 are warning indicators. N3 is energized only when the reset relay is de-energized, ie, normally only when the controlled breaker is open. N1 energized indicates a blown main fuse. N2 energized indicates an open tube heater.

Time delay curves in Fig 2 were plotted from data obtained from a two-channel oscillograph. The calibration circuit is shown as Fig 3. Application of voltage input of pre-set magnitude to the relay and simultaneous application of a marker voltage to channel 1 of the oscillograph results from closing the "start" switch. Operation of the trip relay energizes calibrating auxiliary TX and applies a marker voltage simultaneously to the oscillograph's channel 2. The normally closed contact of TX opens, thus de-energizing the reset relay as in actual operation. Relay TX remains energized through its normally open contact until the input signal is removed by opening the start switch, and the rest switch is opened to permit further operation. The time delay was then obtained from the distance between the two marker voltage traces on the oscillogram and the known chart speed.

FIG 2 Volt-Time Characterstic of Electronic Relay for Breaker Tripping

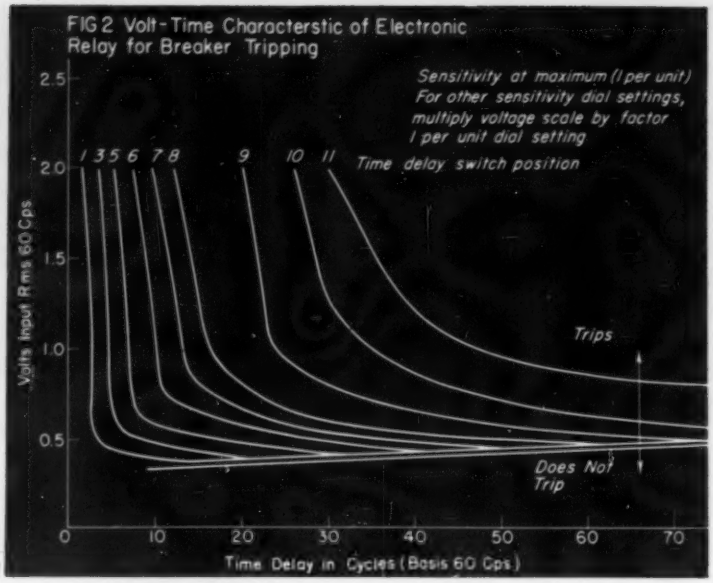
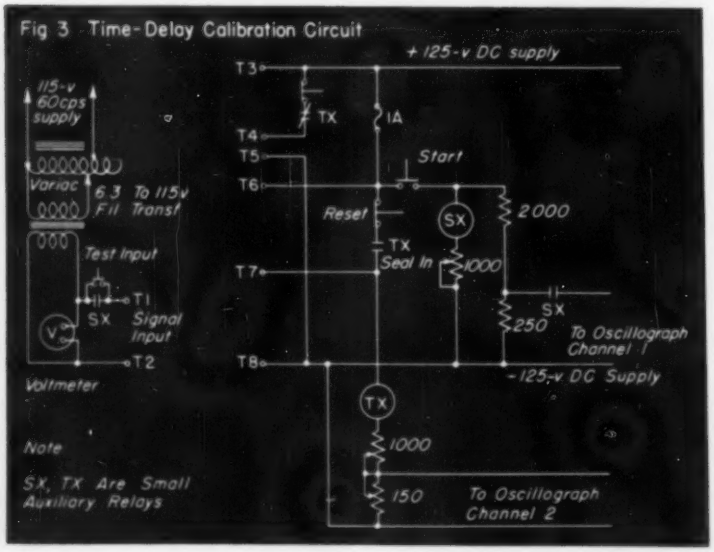


Fig 3 Time-Delay Calibration Circuit



The Commission considered it very desirable to make routine operational checks without system disturbances or specially trained personnel. To this end a checking circuit was installed, consisting of a spring loaded lever switch (S1a, S1b, S1c), a small filament transformer, 1,000-ohm wire-wound potentiometer, and 100-ma dc millameter.

With switch S1 in position 1 (normal) the meter is shorted, and the relay is in normal service. In position 2 the trip circuit is opened, the meter short removed, and the normal or near-zero plate current of the three 6V6's can be read. In position 3 a 60-cps test signal, pre-adjusted to the same or slightly smaller magnitude than the usual available fault signal, is applied, and the relay operates.

Operating plate current is noted. If it is less than approximately 50 ma, the 6V6 tubes are checked and replaced as necessary. This check can be made very rapidly and conveniently. Switch S1, being spring loaded, returns to normal when released, thus eliminating any possibility of the relay being left in an inoperative condition after the test.

Under certain atmospheric conditions, the couplings to the three phases are affected in a non-uniform manner so that an undesired output voltage is obtained from the broken delta. This output voltage is similar to that obtainable under actual ground-fault conditions. In such circumstances, the relay operates.

Overload indicator is quickly and easily reset by simply pushing indicating light socket up.

The L-M Transformer Overload Indicator is easily installed on transformers in service. It is secured to the transformer tank wall by a stainless-steel zigzag wire wrapped around the tank.

Maintain High Service Continuity With

L-M's New Ambient-Temperature-Compensated Overload Indicator

Accurate, economical, easy to install on transformers in service; measures tank wall temperature; provides continuous overload check without interrupting service.

W. H. ENGLAND
Application Engineer
Protective Equipment Division
Line Material Company

Line Material engineers have recognized the need for an accurate yet economical overload indicator to eliminate the costly and laborious task now required for load checking. In addition, conventional type transformers with overload indicators will eliminate the costly expense of resetting the secondary breaker on protected transformers.

We have therefore developed an indicator that assures positive overload indication, amply meets thermal, mechanical, and economical requirements, and does not interrupt service to customers.

The overload indicator is a tool which you can utilize extensively to obtain and maintain a high continuity of service. It will enable you to keep your hand on the pulse of your distribution load.

Compensates for Ambient Temperature

The device indicates thermal overloads accurately. It measures tank wall temperature (a function of top oil and hot-spot temperatures), and makes proper allowance in transformer loading for variations in ambient temperature.

The indicator is easily installed on transformers in service. It is secured to the transformer tank wall by a stainless-steel zigzag wire wrapped around the tank. On new L-M Round-Wound® transformers from the factory, the indicator is attached to a strap permanently welded to the transformer tank.

Illuminated Target

When the indicator reflects a transformer overload condition, a tube target drops, exposing and energizing a red light. The light is readily discernible in daylight as well as at night.

The indicator target is also available wrapped with reflecting tape, which is exceptionally brilliant and easily distinguished. This indicator without the red light does not require an electrical connection to the transformer.

Low Cost; Pays for Itself

The cost is low. The indicator will quickly pay for itself through reduction in transformer burnouts and elimination of load checks.

Get information on the L-M overload indicator today. Ask the L-M Field Engineer for bulletins and complete information; or write Line Material Company, Protective Equipment Division, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

Illuminated target affords positive overload indication which is easily seen during the day or night.

L-M Transformer Overload Indicator in normal and overload indicating positions. The metallic tank wall heat receiver is semi V-shaped to fit on any size or shape of tank.

209

LM LINE MATERIAL *Protective Equipment*

Leads of 48-inch 600-volt #12 wire furnished as standard equipment.

Bushing-Mounted Indicating Fuse with 48-inch lead can be supplied.

Solder-Sealed Bushings of strong one-piece wet-process porcelain provide a positive, lasting seal.

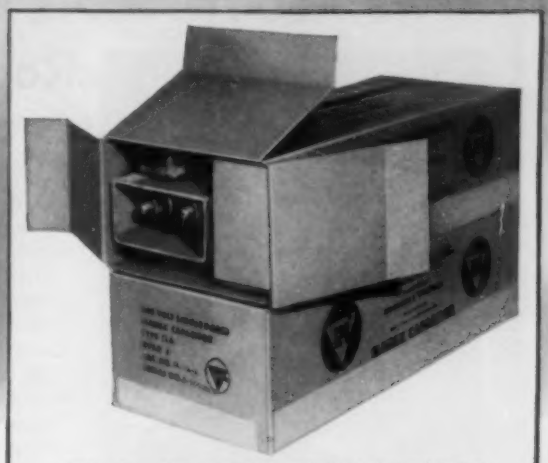
Pole-Mounting Bracket has two 9/16" holes for ½" lag screws. Standard EEI-NEMA crossarm-mounting bracket furnished if required. Capacitor can be mounted with bushings up or down.

Aluminum Metallizing process protects steel tank from oxidation; is followed by a chromate primer and a finish coat of alkyd resin paint.

Single-Pack, Round-Tank Design makes these capacitors small, light, easy to install. Unit has a one-minute discharge resistor; is completely impregnated under vacuum with low temperature Elemex liquid dielectric.

LM® LINE MATERIAL

Left: L-M's 5 kvar is 18⅝" high, weighs only 25 lbs. The 3 kvar is 13¾" high, weighs 18 lbs. These weights include the pole-mounting brackets. Standard EEI-NEMA crossarm-mounting bracket furnished if desired.



L-M's unique shipping carton permits inspecting and testing capacitors without removing them from the carton, simply by opening the end flap—which can be resealed.

Small, Light, Easy to Install . . .

L-M's New Secondary Capacitors Provide Needed Vars For Air-Conditioning Loads

Solder-sealed bushings, aluminum metallized finish on tank, and single-pack construction assure long life, low maintenance.

By **BLAINE SCHULTZ**
Section Engineer
Capacitors
Line Material Company

L-M's new secondary capacitor is your solution to the problem of poor voltage regulation and overloaded transformers caused by low-power-factor air-conditioning loads.

The unit is small, light, and rugged; easy to install on crossarm or direct pole mounting. It offers you outstanding design features, such as aluminum metallized tanks, solder-sealed bushings, one-minute discharge resistor, single-pack round-tank construction, and low-temperature Elemex liquid dielectric.

Protective Coating

L-M's unique aluminum metallizing process prevents oxidation of the steel tank and greatly extends the life of the capacitor. This process is followed by a chromate primer and a finish coat of alkyd resin paint. The finish coat is dark in color to facilitate heat radiation and keep the capacitor at low operating temperatures.

Solder-Sealed Bushings

Strong solder-sealed bushings of one-piece wet-process porcelain provide a positive, lasting seal. By eliminating gaskets and clamps we eliminate leakage. Therefore the capacitor can be mounted with bushings up or down.

Pack Construction

The packs are assembled in air-conditioned rooms to assure uniformity and are tested with over-voltage to eliminate any actual or potential defects. The units have a one-minute discharge resistor to assure safe handling and storage.

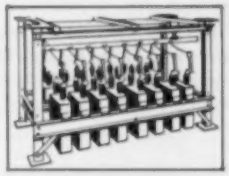
L-M's new 240-volt, pole-mounted, secondary capacitors are available in 3 and 5 kvar. 48-inch leads are furnished and external bushing-mounted indicating fuses can be supplied when required.

Ask us for complete information

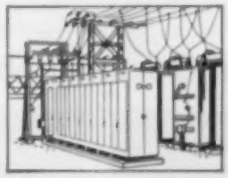
Ask the L-M Field Engineer for complete information on construction and application of L-M's secondary pole-mounted and submersible capacitor equipments, 2400- to 13,800-volt equipments, and our capacitor bank engineering service. Or write Mr. Delaney at Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

Other L-M Capacitor Equipments

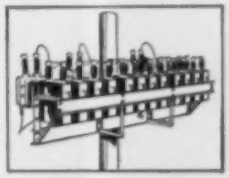
L-M offers a complete line of power capacitor equipments, such as these:



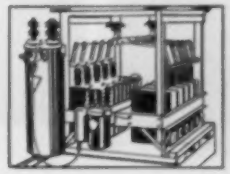
Factory-assembled blocks, which save time and money in building large banks.



Metal-enclosed capacitor equipments in all NEMA-standard sizes and ratings.



Factory-assembled racks for pole-mounted banks, both three-row and single-row styles.



VDS-Method factory-assembled block for multi-step bank switching—an exclusive L-M method that offers a substantial saving on switching equipment.

Also custom-designed protective and switching schemes.

Elemex® Capacitors

D. B. HYER, JR

Rocky Mountain League Elects Hyer President

D. B. Hyer, Jr, president of Southern Colorado Power Co, was elected president of Rocky Mountain Electrical League at the group's annual fall meeting held at Jackson Hole, Wyo.

Hyer joined Southern Colorado Power when he was elected executive vice president Jan. 1, 1951. Two years later he was named president and a director of the utility. He has also served as vice president of Rocky Mountain Electrical League.

An electrical engineering graduate of Georgia School of Technology, Hyer served many years with Florida Power Corp and its subsidiary, Georgia Power & Light Co. He held a number of commercial and engineering posts with the two Southern utilities before becoming director of industrial development in 1945. Hyer was named general commercial manager six months before he accepted the Colorado vice presidency.

LA Department Names Head

William S. Peterson has been appointed to succeed Samuel B. Morris as general manager and chief engineer of Los Angeles Department of Water & Power. Peterson has been the department's assistant general manager and assistant chief engineer since 1953.

An electrical engineering graduate of University of California, Peterson started with the Los Angeles department in 1922 as a mechanical electrical draftsman. He was advanced to chief electrical engineer before becoming assistant general manager.

Peterson is noted for his design work on the 287,500-volt Boulder transmission line which feeds Hoover Dam power to Los Angeles. He is a fellow of American Institute of Electrical Engineers and vice president of American Public Power Association.

W. S. PETERSON

Kuhlman Elects Fluehr President and Greenwalt Executive VP

G. R. FLUEHR

H. E. GREENWALT

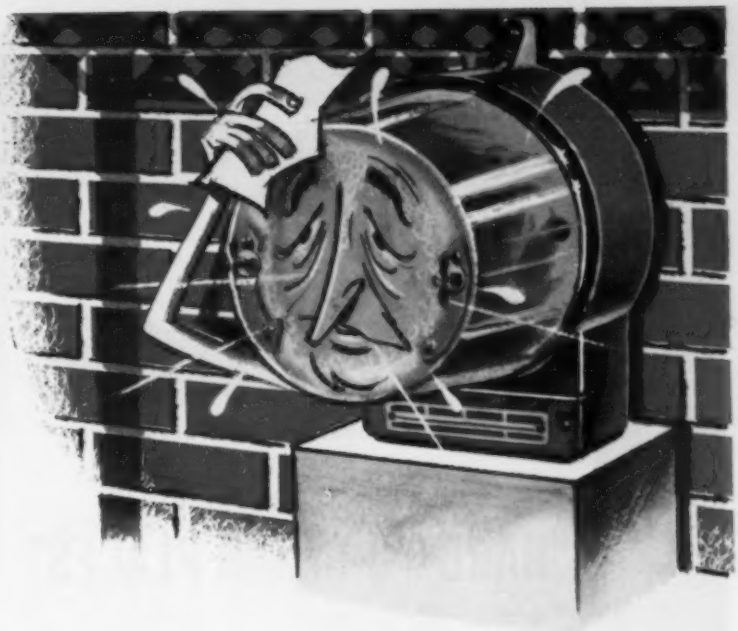
Kuhlman Electric Co has elected George R. Fluehr president and H. E. Greenwalt executive vice president, secretary, and general manager. Fluehr, who succeeds the late Mrs Viola I. Kuhlman, will retain his duties as treasurer of the company, manufacturers of power and distribution transformers.

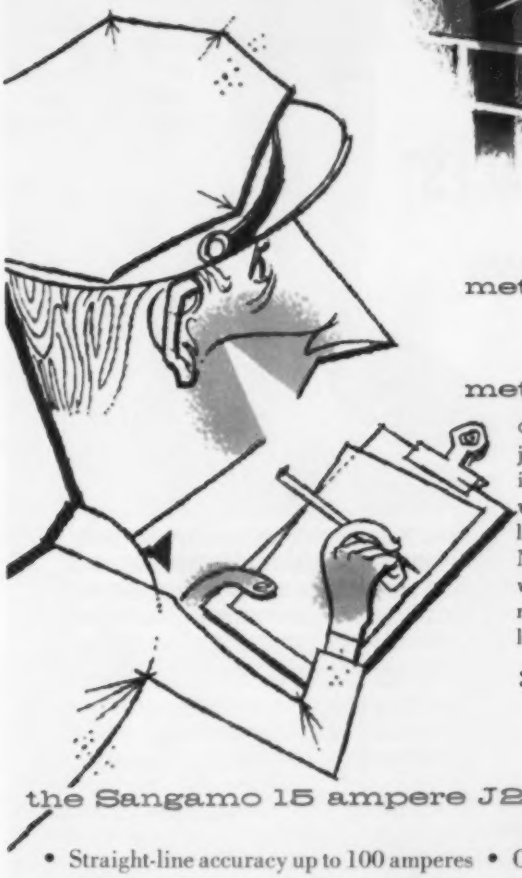
Fluehr became a Kuhlman vice president and director in 1935. Previously he served as a partner of an electrical contracting firm and as a district manager in Northern Illinois Division, Commonwealth Edison Co.

Greenwalt became associated with Kuhlman in 1946 after 21 years service with Standard Transformer Co. He was elected a vice president and director in 1947. Besides his duties as head of Kuhlman operations, Greenwalt will serve as a member of the executive and finance committees.

(*More News About People on page* 39)

if any one of 26 million old meters* could talk...





meterman: Well, how do you feel today, old-timer?

old meter: Howdy, bub! Not so good. When are those fellas down at the light company gonna retire me?

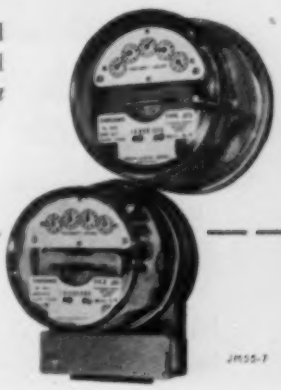
meterman: Why, I don't know old-timer. What's the trouble?

old meter: I'm tired, bub. I just can't keep up with the job. Back in 1939, these Jacksons had a radio, a refrigerator, an iron and a vacuum cleaner... and, of course, their lights. Well, that wasn't so bad. I didn't have any trouble keeping track of a load like that. But today, *whew!* It's just gotten to be too much for me. Now, they've added an electric range, a TV set, an automatic washer and dryer, a dishwasher—and I hear Mrs. Jackson is making a big fuss for air conditioning. I'm not built to measure loads like that. I'm not up to modern living.

* 15 million meters now in service are inadequate for today's loads and 11 million more are in the "doubtful" category according to surveys recently published in *Electrical World*. A copy will be mailed you on request.

the Sangamo 15 ampere J2 is built to handle today's loads

• Straight-line accuracy up to 100 amperes • Corrosion-resistant finishes and materials • High torque, lifetime bearing system • High insulation level • Slow disk speed • *These features make your investment in J2's the best you can make in watthour meters.*



the Sangamo J2 meter is the SLOW SPEED METER

SANGAMO ELECTRIC CO.

SPRINGFIELD, ILLINOIS

ANOTHER REASON WHY UTILITIES EXPECT MORE FROM POWERS-AMERICAN AERIAL EQUIPMENT

POWERS American

Sky-Master

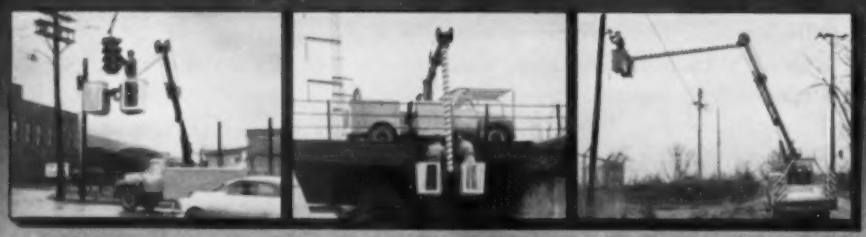
HYDRAULIC AERIAL BEAM

For Placing Workmen in "HARD-TO-REACH PLACES"

UP · OUT · OVER · DOWN

Getting to out-of-the-way, hard-to-reach working areas is a breeze with Sky-Master. Twin, insulated work baskets carry workmen up, out, over, or down . . . provide on-the-ground comfort that speeds up overhead work.

Sky-Master—with accessory equipment for your job—can be furnished on a Powers-American Body that fits your exact requirements. Literature and prices on Sky-Master—in a size for reaching 42' or 48' above ground—will be sent on request.



Powers-American Division

McCABE-POWERS AUTO BODY COMPANY

5800 NO. BROADWAY • ST. LOUIS 15, MO. 625 CEDAR STREET • BERKELEY 10, CALIF.

W. A. MANN

GE Names Mann Commercial VP

William A. Mann has been elected a commercial vice president of General Electric Co with the establishment of a regional headquarters in St. Louis. His territory will cover Missouri, Kansas, Kentucky, and parts of five other states. The region was carved from areas previously served by vice presidents in Chicago, Atlanta, and Cleveland.

Mann has been central district manager of GE's user industry sales department in Chicago since May. The previous seven years were spent as manager of the apparatus sales office in Milwaukee.

A graduate electrical engineer, Mann joined GE's engineering test course at Schenectady in 1923. Transferred to industrial sales, he became assistant Chicago district manager of industrial sales in 1943. From that post he moved to the Milwaukee office in 1948.

Westinghouse Ups Three to Key Posts

Assignments in commercial atomic activities and utility sales have been made by Westinghouse Electric Corp.

Carroll V. Roseberry has been named manager, and Dr William E. Shoupp, technical director of recently formed commercial atomic power activities. The new manager of electric utility sales is P. T. Lagrone.

Previously Roseberry was manager, electric utility and transportation sales department; Dr Shoupp was assistant manager, Atomic Power Division; and Lagrone served as electric utility manager of central region for five years.

C. V. ROSEBERRY

DR W. E. SHOUPP

P. T. LAGRONE

Roseberry and Lagrone have been active in Westinghouse electric utility sales for many years. Dr Shoupp spent 11 years at Westinghouse Research Laboratories before his assignment to atomic power in 1949.

Commercial nuclear reactors will be developed, designed, and sold by the new atomic power operation.

HAROLD A. BUCH (left) is congratulated for serving 35 years as secretary-treasurer of the Pennsylvania Electric Association by Franklin H. Lichtenwalter, managing director of the Association, at the group's 1955 conference

Young Becomes Official of G&W Electric Specialty

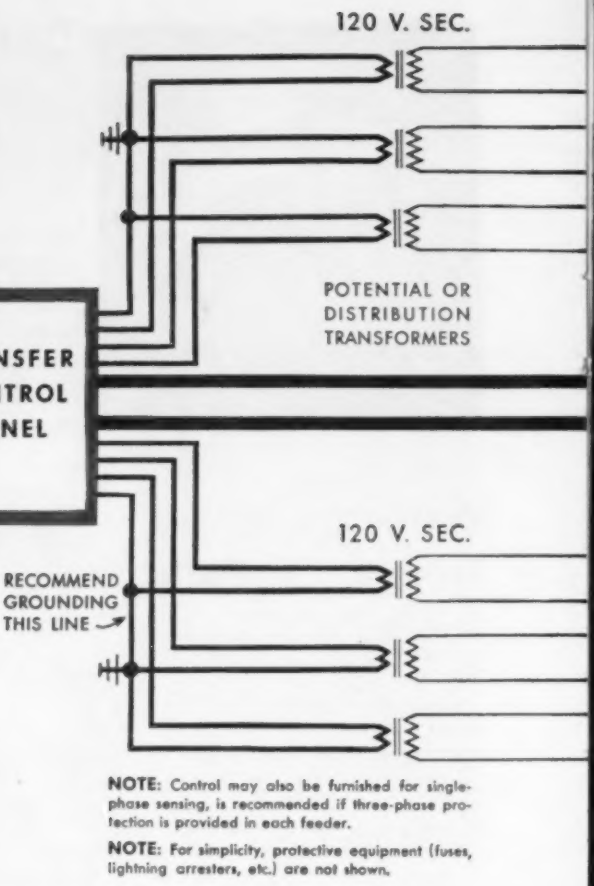
W. F. Young has been named executive vice president and a director of G&W Electric Specialty Co. He succeeds the late Andrew E. Papp (EW Sept. 26, p 39).

Young joined G&W early in 1954 and has occupied the post of assistant vice president for the past year.

The new G&W executive is a 1920 electrical engineering graduate of University of Pittsburgh. His experience includes utilization of electrical equipment with Pennsylvania Railroad and engineering planning and application with Duquesne Light Co. Young also spent two years selling in Los Angeles as a manufacturers' representative after gaining manufacturing experience with Lapp Insulator Co.

TYPE S TRANSFER CONTROL

L-M's Type S automatic load transfer control is completely enclosed in weatherproof steel cabinet. It is designed to operate with L-M's single-phase Type NR switch, heavy-duty Type R three-phase recloser, or L-M's new three-phase heavy-duty Type VR switch.



NOTE: Control may also be furnished for single-phase sensing, is recommended if three-phase protection is provided in each feeder.

NOTE: For simplicity, protective equipment (fuses, lightning arresters, etc.) are not shown.

Automatic Load Transfer Control For 4-Wire Wye System—Three-Phase Sensing

The diagram above shows a typical load transfer scheme. Below is the operating sequence using L-M's new Type VR switch and Type S transfer control panel. This provides an economical and dependable method of assuring service continuity.

Operation of the Three-Phase Sensitive Control

1. Assume load is connected to Source I and potential on either phase A, B, or C is lost. If either X, Y or Z is not energized, no switching occurs. If X, Y & Z become or are all energized, VR on I opens and VR on II closes, after time delay, thus transferring load to other feeder.

2. Assume control is set for "Source I preferred," load is connected to II, and X, Y & Z are energized. If energy returns to A, B & C, VR on II opens and VR on I closes, after time delay.

Assume control is set for "no preference," load is connected to II, and X, Y & Z are energized. If A, B & C are energized, nothing happens. If X, Y or Z then loses potential, after time delay VR on II opens and VR on I closes.

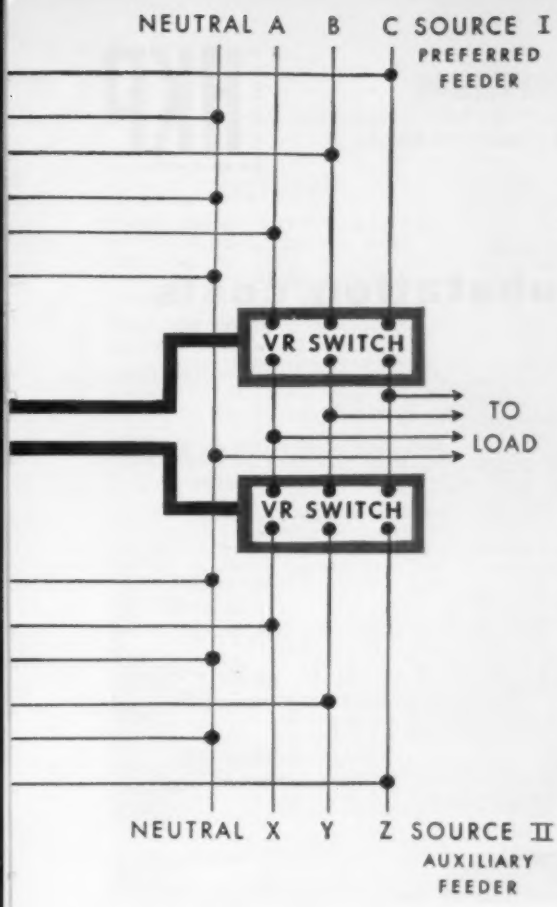
3. Control is sensitive to three-phase energy. It seeks to disconnect single- or two-phase service but will remain on the same source if the other source is not three-phase.

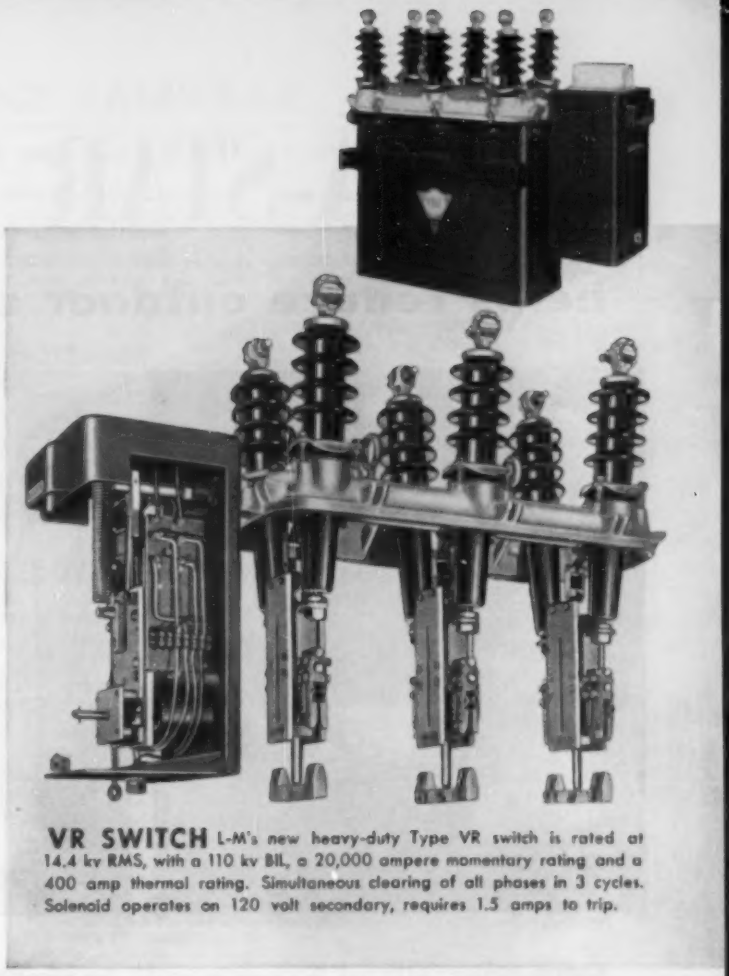
4. Electrical interlock insures that VR I is open before the other switch begins to close. This applies to both automatic and manual motoring operations.

5. Manual switches provided inside cabinet to transfer load to either source. Another switch selects "Source I preferred" or "no preference."

6. Time delay adjustable up to approximately one minute; longer delay (up to 5 min.) available on special order. Same delay, either direction of transfer. Delay should be set to prevent false operation on transient conditions.

LINE MATERIAL





VR SWITCH L-M's new heavy-duty Type VR switch is rated at 14.4 kv RMS, with a 110 kv BIL, a 20,000 ampere momentary rating and a 400 amp thermal rating. Simultaneous clearing of all phases in 3 cycles. Solenoid operates on 120 volt secondary, requires 1.5 amps to trip.

Automatic Switching...

L-M's New Load Transfer Equipment Assures Service Continuity To Important Loads

By **FRANK McSTAY**
Product Manager
Kyle Products
Line Material Company

Distribution systems are being called upon to be even more reliable in supplying power to important loads. Hospitals, radio and television stations, government and many industrial loads must have better service continuity.

L-M's new Type S automatic load transfer control and Type VR heavy-duty oil switch provide an excellent means for automatically switching important loads during feeder outages.

Automatic Load Transfer Control

The Type S control is a pre-assembled, pre-wired relay device which is completely enclosed in a weatherproof steel cabinet. It is quick and easy to install.

Adjustable time-delay relays are used in L-M's Type S controls to prevent false operation on transient conditions. An interlock mechanism in the control circuit permits load transfer to the auxiliary feeder only after the switch has disconnected the faulted feeder. The interlock is also arranged so that the Type S will transfer the load only when the auxiliary or standby feeder is energized.

The Type S control is extremely versatile. It will operate with L-M's single-phase 200 ampere Type NR switch, with the heavy-duty Type R three-phase recloser, or with L-M's new three-phase, heavy-duty Type VR switch. The type S can also be applied to automatic reclosing circuit breakers which have been slightly modified.

Heavy-Duty, Three-Phase Oil Switch

L-M's new remote control Type VR oil switch is a 14.4 kv 400 ampere heavy-duty switch, designed for capacitor switching, distribution feeder sectionalizing, and automatic load transfer applications. The Type VR has a 110 kv BIL with a 20,000 ampere momentary rating. The unit trips and clears all three phases simultaneously in three cycles.

An auxiliary switch is available with the VR or can be added in the field. It may be a one, two, three, or four stage unit, used for remote-position indicating or low-voltage-control switching of apparatus used in conjunction with the VR switch.

Get bulletins and complete information on new load transfer schemes and equipment from your L-M Field Engineer, or write Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

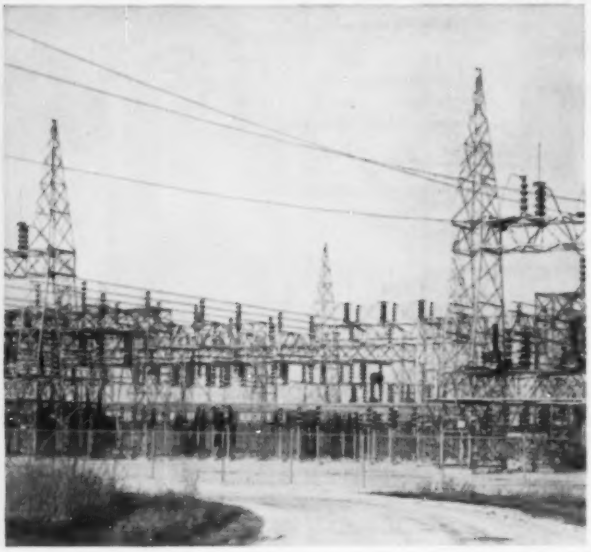
225

Kyle® Switchgear

A DIVISION OF HKP
H. K. PORTER COMPANY, INC.

DELTA-STAR

helps reduce outdoor substation costs



Gain specialized experience, engineering advantages, and complete satisfaction with DELTA-STAR on the job

When planning a new outdoor substation, take advantage of DELTA-STAR's standardized engineering and production methods. You save money in the process—and need not sacrifice your special requirements.

Simply provide a one-line diagram of your proposed installation—for any type of station or any voltage rating. Add information about ground space available, arrangement and height of circuits. DELTA-STAR engineers then go to work for you.

You receive complete construction drawings. When drawings are approved, steel structures are fabricated and galvanized under rigid DELTA-STAR engineering control. All component parts are made ready or provided from stock—from anchor bolts to switch operating mechanism. Assembly and erection is quick and easy.

The result? You hold engineering and erection costs to a minimum. You gain satisfaction of a job well done. To gain these advantages, check DELTA-STAR for your next installation.

When you want the best in outdoor substations, specify DELTA-STAR.

DELTA-STAR ELECTRIC DIVISION

H. K. PORTER COMPANY, INC.
OF PITTSBURGH
2437 Fulton Street • Chicago 12, Illinois
District Offices in Principal Cities

MEETINGS CALENDAR

An extended list of coming meetings appears in the last issue of each month

OCTOBER

EDISON ELECTRIC INSTITUTE—Area Development Workshop, Sheraton Hotel, St. Louis, Mo., Oct. 10-12; Electrical Equipment Committee, Shoreham Hotel, Washington, Oct. 17-18.

INTERSTATE POWER CLUB—Hotel Martinique, New York, Oct. 10.

IOWA UTILITIES ASSOCIATION—8th Annual Management Conference, Hotel Fort Des Moines, Des Moines, Iowa, Oct. 10-11.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS—Lubrication Conference, Hotel Antlers, Indianapolis, Ind., Oct. 10-12.

OKLAHOMA UTILITIES ASSOCIATION—Eastern Electric Light & Power Division, Okmulgee, Okla., Oct. 13; Western Electric Light and Power Division, Norman, Okla., Oct. 14; Accounting Section, Lawton, Okla., Oct. 21.

WISCONSIN UTILITIES ASSOCIATION—Electric & Gas Sections, Schroeder Hotel, Milwaukee, Oct. 12-14.

PENNSYLVANIA ELECTRIC ASSOCIATION—Meter Committee, Bedford Springs Hotel, Bedford, Pa., Oct 13-14; Systems Operation Committee, Hotel Harrisburger, Harrisburg, Pa., Oct. 20-21; Prime Movers Committee, Clearfield, Pa., Oct. 20-21; Electrical Equipment Committee, Hotel New Yorker, N. Y., Oct. 27-28; Relay Committee, Pocono Manor Inn, Pocono Manor, Pa., Oct. 31-Nov. 1.

NORTHWEST UTILITY RADIO ASSOCIATION—Annual Meeting, Electric Building, Portland, Ore., Oct. 13-14.

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS—Fall Meeting, Peabody Hotel, Memphis, Tenn., Oct. 14-15.

AMERICAN WELDING SOCIETY—National Fall Meeting, Bellevue-Stratford Hotel, Philadelphia, Oct. 17-21.

NATIONAL INDUSTRIAL CONFERENCE—Board Meeting, Waldorf-Astoria Hotel, New York, Oct. 20; Special Atomic Energy Conference, Waldorf-Astoria Hotel, New York, Oct. 26-28.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—Application of Motors to Space Heating and Cooling Equipment Conference, Chase Hotel, St. Louis, Mo., Oct. 19-20.

NORTHWEST PUBLIC POWER ASSOCIATION—Power Use Section, Seattle City Light Auditorium, Seattle, Wash., Oct. 20-21.

SOUTHEASTERN ELECTRIC EXCHANGE—Accounting Conference, Hotel San Carlos, Pensacola, Fla., Oct. 20-21; Sales Conference, Biltmore Hotel, Atlanta, Ga., Oct. 27-28.

NATIONAL ASSOCIATION OF RAILROAD AND UTILITIES COMMISSIONERS—67th Annual Convention, Grove Park Inn, Asheville, N. C., Oct. 24-27.

* **AMERICAN STANDARDS ASSOCIATION**—jointly with the National Bureau of Standards, 6th National Conference on Standards, Sheraton-Park Hotel, Washington, D. C., Oct. 24-26.

ELECTRIC COMPANIES ADVERTISING PROGRAM—Management Group Meeting, Pierre Hotel, New York City, Oct. 26.

* **THE MAGNESIUM ASSOCIATION**—Eleventh Fall Meeting, Hotel Biltmore, New York, N. Y., Oct. 31-Nov. 1.

NOVEMBER

NATIONAL ASSOCIATION OF CORROSION ENGINEERS—Northeast Region Fall Meeting, Hotel Niagara Falls, Niagara Falls, N. Y., Nov. 1-3.

ASSOCIATION FOR APPLIED SOLAR ENERGY—World Symposium on applied solar energy, Westward Ho Hotel, Phoenix, Ariz., Nov. 1-5.

EDISON ELECTRIC INSTITUTE—Taxation Accounting Committee, sponsored jointly with American Gas Association, Plaza Terrace Hotel, Cincinnati, Ohio, Nov. 3; Accident Prevention Committee, Beaumont Hotel, Beaumont, Tex., Nov. 13-18; Industrial Relations Committee, Joint Meeting with New England Personnel Group, Somerset Hotel, Boston, Nov. 17-18.

PACIFIC COAST ELECTRICAL ASSOCIATION—Business Development Section Annual Conference, Huntington-Sheraton Hotel, Pasadena, Calif., Nov. 3-4; Hawaiian Section Conference, Honolulu, Nov. 9-10; Administration Services Section Meeting, California Hotel, Fresno, Calif., Nov. 16-17.

AMERICAN SOCIETY OF ELECTRICAL ENGINEERS—Eastern Joint Computer Conference, Hotel Statler, Boston, Nov. 7-9.

INDUSTRIAL MANAGEMENT SOCIETY—19th Annual Time and Motion Study and Management Clinic, Sherman Hotel, Chicago, Nov. 9-11.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS—Diamond Jubilee, Congress, Hilton & Blackstone Hotels, Chicago, Nov. 13-18.

NATIONAL ELECTRICAL MANUFACTURERS' ASSOCIATION—Annual Meeting, Traymore Hotel, Atlantic City, Nov. 14-18.

CHICAGO EXPOSITION OF POWER & MECHANICAL ENGINEERING—Chicago Coliseum, Nov. 14-18.

* **ASSOCIATION OF EDISON ILLUMINATING COMPANIES**—Cable Engineering Section, Bellevue-Stratford Hotel, Philadelphia, Nov. 17.

INTER-INDUSTRY FARM ELECTRIC UTILIZATION COUNCIL—2nd Annual National Power Use Workshop, Chase & Park Plaza Hotels, St. Louis, Mo., Nov. 28-30.

ELECTRIC COMPANIES ADVERTISING PROGRAM—Copy Group Meeting, Ayer Studio, New York City, Nov. 30.

AIR CONDITIONING & REFRIGERATION INSTITUTE—9th Air Conditioning & Refrigeration Exposition, The Auditorium, Atlantic City, N. J., Nov. 28-Dec. 1.

DECEMBER

NATIONAL ASSOCIATION OF COST ACCOUNTANTS—Fairmount Hotel, San Francisco, Dec. 2-3.

AMERICAN WATERSHED COUNCIL, INC—Second National Watershed Congress, Statler Hotel, Washington, D. C., Dec. 5-6.

INTERNATIONAL EXPOSITION—25th Exposition of Chemical Industries, Convention Hall, Philadelphia, Pa., Dec. 5-9.

ENGINEERS JOINT COUNCIL—Nuclear Engineering & Science Congress, Public Auditorium, Cleveland, Dec. 12-16.

EDISON ELECTRIC INSTITUTE—Industrial Relations Committee, EEI Headquarters, N. Y., Dec. 15.

* Additions this week

Canada Reactor Operates After 7-Week Repair Job

Canada's experimental nuclear reactor, after having been shut down for seven weeks because of an accident, has gone into operation again.

The accident which halted reactor experiments at Chalk River, Ont., last July, contaminated heavy water contained in the moderator tank. Small chips of plutonium, broken from fuel elements, adhered to the bottom of the tank, and 6,000 gal had to be flushed through the tank to remove the fragments.

W. J. Bennett, president of Atomic Energy of Canada, Ltd, said that safety devices prevented serious damage to the reactor. The devices had been installed after a major breakdown in 1952.

The heavy water, contaminated in the recent accident, will be purified and used in another reactor now undergoing construction (EW, Aug. 8, p 62).

British Teach Atomics

For the first time foreign students attended a course on industrial atomic techniques at Britain's Harwell Atomic Energy Research Establishment. The second-year offering of the 11-week session is slated to cover unclassified information on atomic power station construction. British industry was represented by 28 students, and Australian Atomic Energy Commission, by six. Fifteen came from Argentina, Brazil, Belgium, Denmark, West Germany, Sweden, Spain, Yugoslavia, India, and Pakistan.

HARLLEE BRANCH, left, Edison Electric Institute president, greets Paul B. McKee, Pacific Power & Light Co president

Rocky Mt Electrical League Told . . .

SELL . . . Electrical Living

SELL . . . Electrical Industry

Ways to boost the tempo of selling both electrical living and the electrical industry to the American public were underscored time and again at the 52nd annual convention of the Rocky Mountain Electrical League, Sept. 12-15. Plans for an ambitious mass market development program, a call to remove tax inequities, the case for more residential lighting load, and the personalizing of electric service all were aired before more than 250 registrants attending the meeting at Moran, Wyo.

GE Pushes All-Electric Home

Believing united industry effort is needed to bring the all-electric home to the American public, General Electric Co previewed plans for a united-industry residential market development program. (EW, Sept. 19, p 112).

Tentatively titled "Live Better . . . Electrically," the program, as envisioned by GE and presented by Roy W. Johnson, its executive vice president, would provide a "united front to electrical living." It would cross the entire industry and place heavy reliance on local promotional activities by utilities and their trade allies.

General Electric, said Johnson, would stand ready to furnish manpower and promotional tools to back up local utility efforts. Basic promotional materials, he said, would be supplied by GE at cost. None would carry GE identification.

Johnson said the full program would be presented personally to individual utilities "in the very near future." Among its features:

1. A program guide to help utilities tie-in with the nationwide market development program and to help them gain support from local trade allies.

2. A closed circuit telecast (production costs paid by GE) piped in to help utilities stimulate contractor, architect, dealer, and other trade support.

3. A nationwide television spectacular just before utilities launch their local programs.

4. A motion picture for civic and club use.

5. A "Builder's Specification Catalogue" for trade groups and a "Home Planning Guide" for consumer distribution.

6. "Live Better . . . Electrically" ads in national consumer magazines.

Other Firms Invited to Join

GE's investment in the program, Johnson pointed out, would be over and above its existing product promotion although it would orient its present efforts to the overall program theme. He invited other electrical manufacturers also to join in furnishing materials for the program.

A return to the selling of first things —the fundamentals of democracy— was the challenge laid down by Harllee Branch, president of Edison Electric Institute and Georgia Power Co (EW, Sept. 19, p 109). The basic policy of freedom of opportunity throughout the country is threatened by adverse administration of the preference clause and tax inequities existing between public and private power companies, Branch warned.

Branch's Fair Play Program

He outlined a program aimed at restoring a greater measure of fair play to all citizens. Under the program:

1. Government-owned or subsidized utilities would be required to pay federal, state, and local taxes or full equivalents on the same basis as private companies.

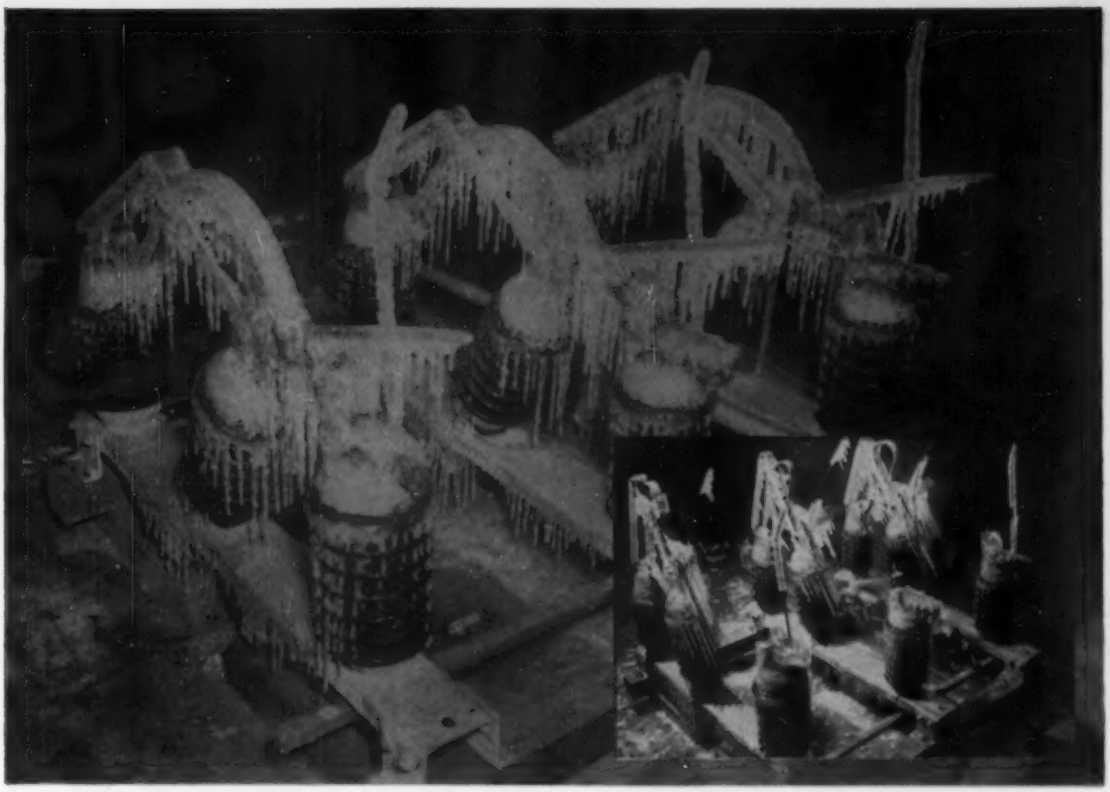
2. Non-private utilities would charge rates that return the true charges on the cost of building and operating electric systems.

3. Byproduct power from hydro or steam plants would be sold at fair market prices to all systems on the basis of their number of rural and residential customers.

4. The government would cease in its attempts to serve in a utility capacity.

The neglected market of residential lighting has a reasonable potential of 105 billion kwhr, or a 20% increase in residential load, according to Edwin Vennard, president of Middle

(*Continued on page* 46)



you can always open or close

CHANCE WN-VN SWITCHES

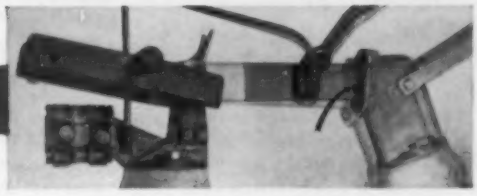
...even after the heaviest ice storms

It only takes one man at the controls, even after the most severe ice storms, to open or close Chance WN-VN pole top switches. The heaviest ice... ice that will not yield to solid hammer blows is broken by the "crow bar" leverage of the blade and the *extra* leverage of the Compensator Control Mechanism.

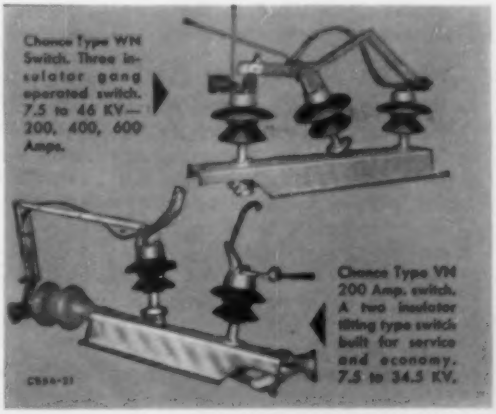
Under test conditions, Chance WN-VN switches have been coated with three-quarters of an inch of hard, clear, bubble-free ice made from distilled water. In temperatures ranging from 20° above zero to 16° below zero, these switches were opened and closed without difficulty... and with no resultant damage to blades or mechanism.

Because of the Compensator Control, all blades in a three-pole switch always make complete contact—regardless of warping, twisting, settling or bowing of wood supporting structures.

Chance WN-VN pole-top switches are easily and economically installed... no threading of the shaft is required. For reliable switching under any conditions plus minimum maintenance, specify Chance Type WN or VN switches. Write for complete information and prices.



Double exposure shows exclusive ice breaking "crow bar action." Pivot pin is forced up against slot in blade—prying rear of blade up 3/8" before contact end is lifted. Clamp shown in photo was used to simulate the effect of heavy ice on the clip.


Chance Type WN Switch. Three insulator gang operated switch. 7.5 to 46 KV—200, 400, 600 Amps.
Chance Type VN 200 Amp. switch. A two insulator tilting type switch built for service and economy. 7.5 to 34.5 KV.

You know it's RIGHT when you specify CHANCE

A·B·CHANCE CO.

CENTRALIA, MISSOURI
SAN FRANCISCO, CALIFORNIA

Sell Electrical Living . . . Sell Electrical Industry

(*Continued from page* 44)

West Service Co, Chicago. This load, he said, can be quite effective in building net return. A small percent increase in system load factor resulting from increased residential lighting load will give the same return on net income as a 20% increase in rates.

Vennard Offers Lighting Plan

Vennard offered three steps in setting up an effective residential lighting program.

1. Find out what your company is doing about home lighting.

2. Put the program in the hands of responsible and energetic men.

3. Make a survey of home lighting in the company service area.

For the period immediately ahead and for the long run prospects are excellent for a sustained high level of prosperity, said Dexter M. Keezer, vice president and director of economics, McGraw-Hill Publishing Co. Expansion of new plant and equipment and desperately needed public facilities promise to offset a let-down in auto production and some let-down in housing.

$8 Billion For Research By '60

For the long pull, probably the most significant fact is the spending of about $4 billion annually for research, said Keezer. We probably will be spending as much as $8 billion by 1960.

Instead of lulling ourselves to sleep with how well an area is saturated with appliances, we should emphasize the potential remaining to be sold in the area, John F. McDaniel, vice president of Hotpoint, Inc, Chicago, told the convention. Selling potential requires better merchandising, new methods of distribution, and faster and less-costly installations.

Why Was It Done That Way?

Rather than jog along the old fashioned way, Texas Electric Service Co, is seeking ways to improve, perfect, and provide better service, said J. B. Thomas, president. A company-wide "challenge" committee which asks "Why was it done this way?" has realized many thousands of dollars in savings by suggesting new designs and methods.

The industry must work out a practical underground distribution system for better residential areas or have its house fall in, Thomas said. Also the transaction of presenting the bill for electric service must be personalized to keep faith with the American housewife.

"Do they know anything good about you?" asked Kenneth Haagensen, director of public relations, Allis-Chalmers Manufacturing Co. From the chairman of the board to the newest employee, all company personnel need the proper package to merchandise the organization they represent.

Public Power Failed

The story of government unwilling or unable to do the full job of supplying one small region with electric power is the one industry should be telling throughout the nation according to Paul B. McKee, president, Pacific Power & Light Co.

McKee said a minimum of 600,000 kw and $300 million will be needed annually in the Northwest during the next decade. If the government would continue to spend money for power development in the area as it has in the past decade—$150 million annually, it would be only half enough to do the job.

Dixon-Yates Brought Gains

Most prominent of the tangible gains to come from the Dixon-Yates project, said Paul Hallingby, Jr, vice president, Middle South Utilities, Inc, is that government-ownership proponents actually lost the struggle. Various precedents that would have been set by the proposed Fulton steam plant of TVA went by the board. Moreover if the city of Memphis builds its own steam plant, it will be the first wholesale customer of TVA to break the "sole supplier clause" stranglehold.

D-Y Incident Danger Sign

The Dixon-Yates incident represented a danger signal to freedom in this country, said Dr Preston Bradley, noted Chicago author and lecturer. It emphasized the most important factor in a democracy—that personality which creates public opinion. This personality is inherent in government, the news media, and educators.

By 1965 it seems likely that there will be 4 million kw of nuclear power plants, with the total rising to about 100 million kw by 1985, said Dr W. E. Shoupp, technical director of commercial atomic power activities, Westinghouse Electric Corp. Some believe that nuclear power can be competitive in the hard coal fields of Pennsylvania within seven years, he observed.

The current "peace" offensive of the Russian and Chinese Communists is not a change in purpose but merely a change in tactics, Robert R. Gros, vice president, Pacific Gas & Electric Co, told the meeting. This country must not allow itself to be misled once again. The United States, said Gros, is the only military and spiritual bulwark against Communism. And strength alone is the only thing it understands.

Hyer Elected President

Heading the list of new officers elected at the meeting was D. B. Hyer, Jr, president of Southern Colorado Power Co, Pueblo, who was named president of RMEL. New vice presidents include Guy W. Thomas, Public Service Co of Colorado, Denver; W. D. Johnston, Pacific Power & Light Co, Casper, Wyo.; and R. D. Moody, Allis-Chalmers Mfg Co, Denver.

LEGAL NOTICE

STATEMENT REQUIRED BY THE ACT OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946 (Title 39, United States Code, Section 233)
SHOWING THE OWNERSHIP, MANAGEMENT, AND CIRCULATION

Of Electrical World published weekly at Albany, New York for October 1, 1955.

1. The name and address of the publisher, editor, managing editor, and business manager is: Publisher, McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York 36, N. Y.; Editor, Fischer Black, 330 West 42nd Street, New York 36, N. Y.; Managing editor, D. T. Braymer, 330 West 42nd Street, New York 36, N. Y.; Business manager, Otto A. Dreschel.

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5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: 24,751.

McGRAW-HILL PUBLISHING COMPANY, INC.
By J. A. GERARDI, Vice Pres. & Treas.

Sworn to and subscribed before me this 15th day of September, 1955.

[SEAL] ELVA G. MASLIN.
(My Commission expires March 30, 1956)

Another Extra, Beyond ASA Standards, that accounts for high reliability and high value

Proper performance of sealing gaskets in a bushing depends upon two factors: (A) A definite compressive force. (B) Maintenance of this force despite slight dimensional changes caused by expansion and contraction movements, and by any loss of original gasket volume.

This is not a new discovery. Over 30 years ago, O-B pioneered in a bushing assembly method that has since been almost universally adopted -- spring compression assembly. Long ago, this worked a vast improvement in bushing performance and reliability. With today's more critical new designs to produce the slim, efficient ASA Standard, O-B's long-proved compression spring assembly practice takes on added importance. Modern bushings, which depend upon the integrity of paper dielectric, must be protected with a total oil and moisture seal.

At time of assembly, a simple jig measures and sets the force exerted by the compression spring mechanism. Special parts retain this setting for the bushing's life. Over the slight amplitude of expected movement, this compression never varies. Gasket loading is measured, controlled, and un-changing, even after any volume loss.

Spring compression assembly and dependable sealing practices *are in no way covered by national standards.* This is just one of many extra touches of quality, and one of many extra reasons for performance, you will find in O-B's new bushings. Specify O-B on your station equipment and put all these extras to work for you.

the heart of every *Ohio Brass* bushing

4528-H

DAVENPORT OFFICE MANAGER LANGE FOLLOWS UP CUSTOMER'S COMPLAINT

Query Customers by Mail

Illinois-Iowa G&E questionnaires reach 6,000 homes monthly; replies and follow-up guide management in improving service

A continuing customer-attitude survey is a basic feature of the public relations program of the Iowa-Illinois Gas & Electric Co.

In effect since January 1954 the survey samples by mail each month the thinking of some 6,000 of the company's 110,000 residential customers in regard to the service provided, conduct of employees, and other phases of company operation. All data are compiled and recorded for reference in initiating improvements in policies, and procedures. One objective is to give all customers an opportunity to comment or complain about the service. The survey:

Has These Objectives

1. Provides management with a continuing appraisal of customer attitudes.
2. Permits reselling the company to customers who might otherwise have remained disgruntled for years.
3. Keeps management, department, heads and supervisors informed of policies, practices, and procedures which need attention.

The program was comparatively easy to organize and inexpensive to administer.

All indications of dissatisfaction expressed on survey cards are followed up regardless of how small the complaint or request. The good will gained from these follow-ups is immeasurable. Customers are usually surprised and pleased to have a company representative take the time to discuss their complaints personally. A customer's casual mention of this to a neighbor can be a great help to a company's public relations, just as his loud explanation of an unsettled complaint can be damaging.

The mail-type survey has proved to be superior to the personal interview because of the low cost, ease of administration, and number of contacts permitted. Customers seem to express themselves more frankly through a postcard questionnaire than during a personal interview.

With only a limited space on the postcard questions had to be selected with care in order to cover the desired number of subjects. The questions asked are:

"Do you consider the gas and/or electric service which you receive from this company: excellent, good, fair, or poor?"

"Do you consider the service provided by Iowa-Illinois employees in response to your requests: excellent, good, fair or poor?"

"Have you found Iowa-Illinois employees to be: very accommodating, cooperative, reasonably satisfactory, or indifferent?"

"Do you recall an experience with this company or its employees which was particularly annoying or pleasing to you?"

"Do you have any comments or suggestions for the improvement of the service provided and/or the procedures followed?"

Response Is About 19%

The response to the survey has been most gratifying. Approximately 19% of all cards mailed have been returned. That means that over 17,000 customers have expressed their opinions in the first 17 months of the survey. The return varies with the areas covered each month and apparently with the weather. For instance, in the summer months the response is lower.

The mechanics of the program are simple. Each month one of the 21 meter areas is covered. Approximately 6,000 cards are mailed to customers in Rock Island, Moline and East Moline, Ill., and Davenport, Cedar Rapids, Fort Dodge, Iowa City, and Ottumwa, Iowa.

Each card returned is tabulated. When a complaint or request is on the card, it is sent to the department responsible. The customer is then contacted in person, by telephone, or by letter. After the follow-up, the results are written on a special form and sent to the public relations division where they are kept on file.

Customers Are Pleased

Customers have repeatedly expressed pleasure at receiving special attention. Company representatives play no favorites. They give just as much attention to complaints that are years old as to recent ones. Criticisms received on the cards frequently help to clear up misunderstandings which have gone on unknown for years. One lady even filed a complaint which went back 17 years.

Many requests, friendly criticisms, and favorable opinions are expressed. In fact, there are many more "bouquets" than "brickbats." To the authors of complimentary comments "thank-you" notes are mailed.

K. K. ALLEN

C. Y. OSBURN

H. N. HENRY

DEWITT PIKE

Manpower Use Must Be Efficient

EEI Industrial Relations Conference in Chicago hears speakers outline various phases of how to make personnel administration a profitable operation

Four keynote speakers set the pace for the annual Conference of the Industrial Relations Committee of Edison Electric Institute. Held at Chicago, Sept. 19-21, the conference had as its theme, "Making Personnel Administration Pay Off". Each of the keynoters covered one phase.

The first keynote speaker was K. K. Allen, manager of industrial relations, Southern California Edison Co. His topic was "Living Profitably Under the Union Contract."

Personnel administration is a business function, he said. It is the same as that of any other department in the company. Every dollar spent in this function should be measured as to its proportionate contribution to the whole.

Keep Union Contracts Flexible

Allen suggested that the companies must try and keep the union contract flexible enough to meet varying conditions, such as technological changes, etc. Keep operations under the contract efficient and humane. Negotiations, he concluded, must be conducted by management personnel who understand all phases of bargaining.

The second keynote speaker was C. Y. Osburn, assistant vice president, Long Island Lighting Co, who spoke on "Using Manpower Effectively."

He said long-range planning affects labor costs. An efficient and profitable work force is the result of taking into consideration many diverse and at times intangible factors.

Giving careful thought to three principal factors will result in an optimum contribution to the company's profitable operation. These factors, he said, are working conditions, administration, and training.

Keep Productivity Up

While the broader subject of union relations was handled by Allen, Osburn discussed the necessity of securing union cooperation by keeping costs down by keeping productivity up. Developing increased employee receptiveness to this idea, he said, is one of the big challenges facing today's management.

H. N. Henry, executive vice president, Alabama Power Co, was the third keynote speaker. His topic was "Making Employee Service Profitable."

He pointed out that many employee services, taken for granted too frequently these days, can make a real contribution through improved employee morale to the company's profit position.

Employee services, Henry said, are a part of the "Fringe Benefit" package of today. They exclude such things as pensions, sick leave plans, vacations, etc, and include suggestion systems, coffee breaks, recreation clubs, to name a few.

In looking at these services, he said, credit unions may be a real item of cost through administration activity even though there is no cash outlay.

The fourth keynoter was Dewitt Pike, superintendent of the employee relations department, Rochester Gas & Electric Corp, whose topic was "Making Communications Pay Off."

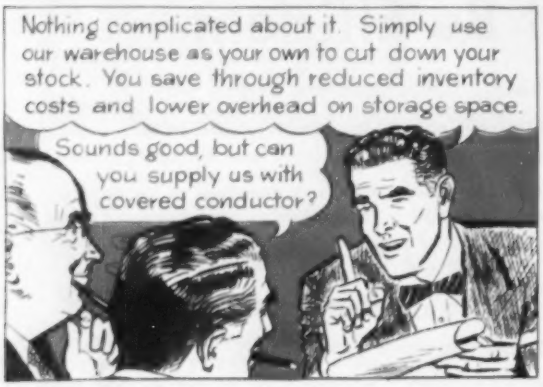
Have Communications Pay Off

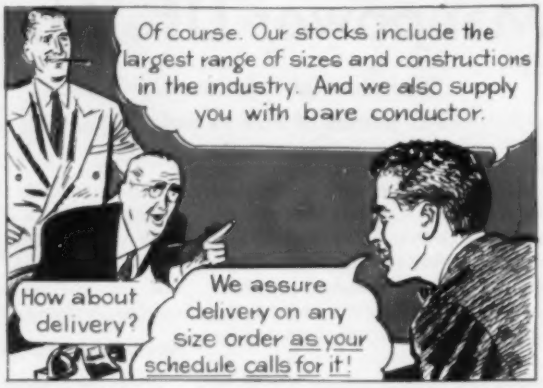
Communications pay off, he said, when sound thinking plans the communique. The proper medium must be selected. The presentation must be straightforward and not, above all, talking "down" to the employee. There must be a "point" to the message. Following such a simple guidepost, he said, can only result in communications that will create a receptiveness on the part of the employees to management's messages.

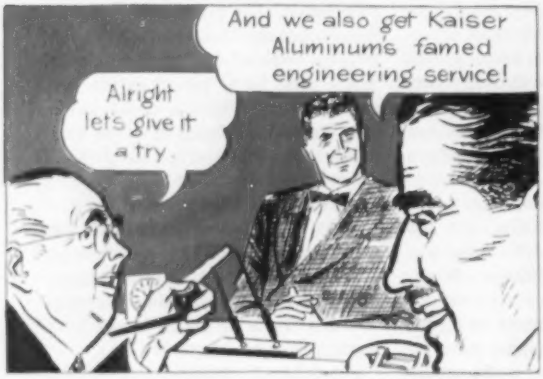
After these four keynote addresses were made, some 275 management representatives of the electric industry discussed these day-to-day problems in small "How to Do It" round table conferences.

John Arnell, director of industrial relations, Consolidated Edison Co of New York, is chairman of EEI's Industrial Relations Committee. Thomas G. Ayers, vice president, Commonwealth Edison Co, was chairman of the 1955 Annual Round Table Conference Committee. Other members were: K. K. Allen, Southern California Edison Co; C. H. Campbell, Pacific Power & Light Co; J. W. Carothers, Baltimore Gas & Electric Co; J. S. Gracy, Florida Power Corp, and W. H. Senyard, Louisiana Power & Light Co.

(For luncheon talks see page 51)


Nothing complicated about it. Simply use our warehouse as your own to cut down your stock. You save through reduced inventory costs and lower overhead on storage space.
Sounds good, but can you supply us with covered conductor?


Of course. Our stocks include the largest range of sizes and constructions in the industry. And we also supply you with bare conductor.
How about delivery?
We assure delivery on any size order as your schedule calls for it!



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City Electric Distributors, Inc.
Corpus Christi Hardware Co., Inc.
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Dutton-Lainson Co.
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United Electric Supply Co.
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Virginia Electric, Inc.
George H. Wahn Co.
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GET IN TOUCH with your nearest Kaiser Aluminum Distributor *now!* Refer to the list at the left and your local telephone directory. Kaiser Aluminum and Chemical Sales, Inc., *General Sales Office*, Palmolive Bldg., Chicago 11, Ill.; *Executive Office*, Kaiser Bldg., Oakland 12, Calif.

Kaiser Aluminum

THE NATION'S LARGEST SUPPLIER OF ALUMINUM WEATHERPROOF CONDUCTOR AND TRIPLEX

Luncheon Talks
EEI Industrial Relations Conference

(*Continued from page* 49)

Harllee Branch, president, EEI, Georgia Power

"Our industry has done an exceptional job in convincing its customers and the general public that electricity is essential to modern living. We have done such a good job, in fact, that the demagogues and the advocates of Socialism would like now to take over our service as an extension of governmental activity. We must operate our companies and that means we must elect and train our personnel with this threat in mind.

"It is no longer sufficient that our employees—particularly those in key managerial positions—be skilled only in their immediate functions. They must also be men of vision and articulateness—with enough intelligence to cut through the fuzzy-thinking that characterizes so much of today's political diet, and with enough courage and energy to defend the institution and the system which have provided them with jobs."

N. Bernard Gussett, president, Iowa P&L

". . . You have a hand in negotiating labor rates and in recommending salary levels for many non-union categories. . . If you will spend . . . time to acquire a proper understanding of earnings position of your company you will be much better prepared to engage in negotiations and to impart to others a better understanding of the necessity of profits and how difficult they are to produce. Also, you will better understand the nature of our business and how its regulated operations and profits differ in continuity and amount from other businesses, particularly in the manufacturing fields. There is no question that such an understanding exists at the top levels of many large unions. However, it is often decidely lacking at the level of local negotiating groups, often on both sides of the table.

"It is conceivable that these studies may lead you into a better understanding of the conditions under which your company must operate. They may furnish you with reasons why it does better or does worse than a neighbor."

John W. Evers, president, Commonwealth Edison

"Not all employees are sufficiently interested or articulate enough to be spokesmen for the public utility industry or their own company. But most of them are able and willing to act as goodwill ambassadors for the company that is smart enough to keep them informed. Relationships with people are fluid. They ebb and flow in a thousand little eddies every day. They change and adjust under the constant pressure of doing business in a dynamic society. That's why it is so important for management to be change-minded. We must be sensitive to the reactions of both employees and customers.

"On the whole, it has been our experience that a good relationship with our people can be strengthened by a forward-looking, change-minded program—if it is right in principle, if it's practical in approach, and if it is thoroughly explained to the people involved. Building a solid community reputation is a long-range, continuing process, fashioned out of the experiences of day-to-day operations."

Super power transformers pace utility expansion

Breaking the Barriers of High Voltage Transmission

THIS 330,000-volt, 125,000-kva power transformer is the first of four of this rating being built by Allis-Chalmers for the Clifty Creek Plant of the Indiana-Kentucky Electric Corporation and the Pierce Switching Station of the Ohio Valley Electric Corporation. These four autotransformers will serve as part of the highest voltage transmission system now operating in the country.

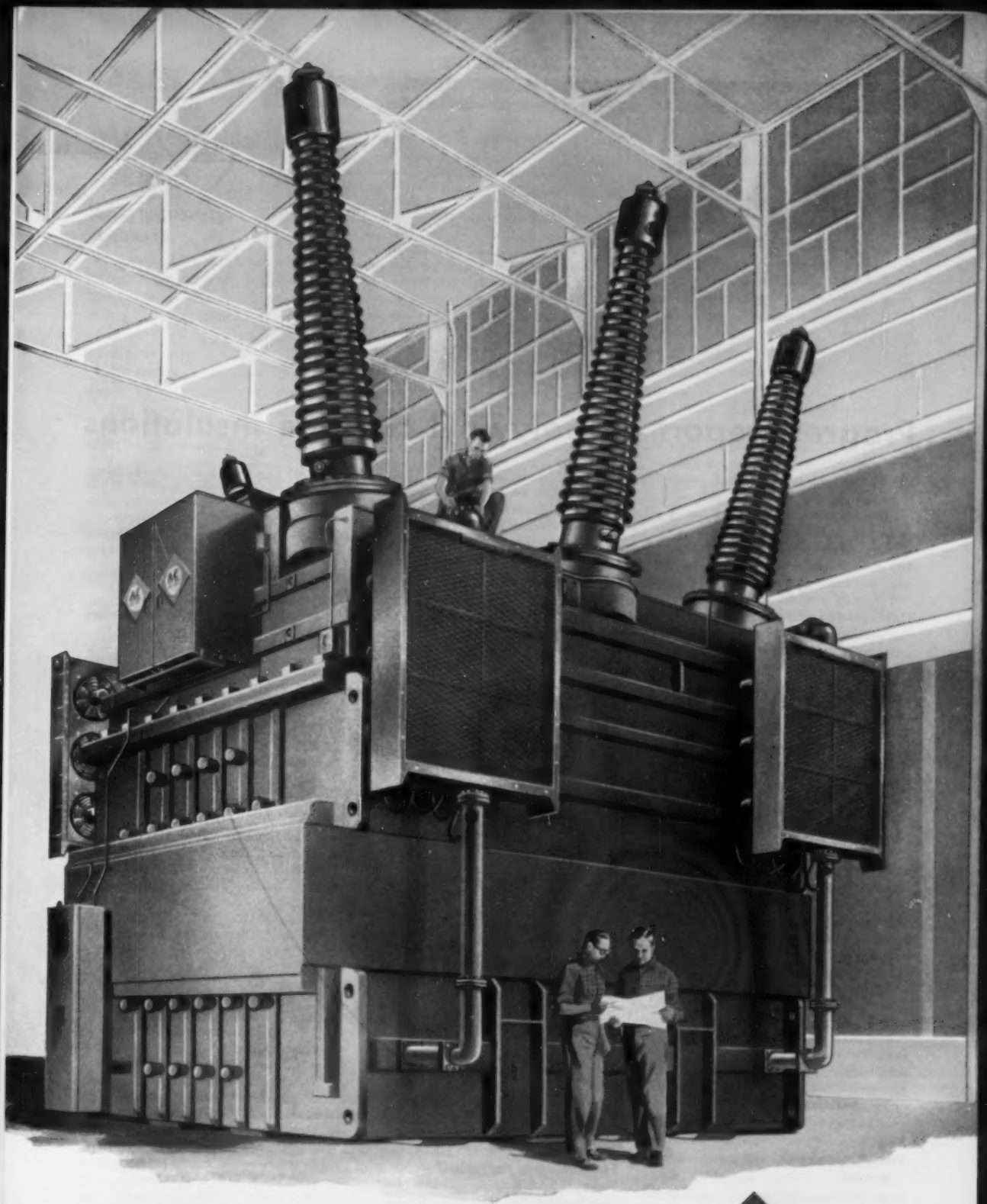
The two companies are completely new utilities, formed by the combined efforts of 15 privately owned power companies to supply the power needs of a new atomic plant in Ohio. They represent a unique contribution by America's power companies to industrial progress.

Enormous transformers like these are examples of the type of equipment needed by utilities to serve ever-increasing power needs. Allis-Chalmers has consistently set the pace in development of power transformers for utility systems all over the country. Here are a few of the features of this power transformer worth special note:

- Allis-Chalmers developed *Electro-Coolers* are mounted nine feet above the foundation line so that possible flood crests cannot interfere with effective operation of the unit.
- Like every Allis-Chalmers power transformer, this unit is corona-free. Regardless of its large size, the creeping deterioration of corona will never shorten this transformer's effective operating life.
- New techniques for welding aluminum, developed by Allis-Chalmers specially for power transformers, reduce weights of end frames considerably. Although structural strength has not been affected, shipping and installation will be far easier.

An Allis-Chalmers representative will be glad to talk over these and other new transformer developments with you at your convenience. Call the nearby A-C office or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-4771

ALLIS-



CHALMERS

A-C ALLIS-CHALMERS

ADVERTISEMENT

Highlights in development of pvc compounds for wire and cable

1932. Experimental work began.

1935. First commercial production, principally for signal and instrument wiring.

1938. Underwriters' approval in appliance lead wires.

1930-40. Underwriters' approval as Type T wire for rewiring jobs.

WORLD WAR II YEARS. Military applications: communications, power, electronics, signalling and others (including aircraft and shipboard);

Code recognition for use as Type T wire for new installations;

Underwriters' approval (1943) and NEC recognition as Type TW for wiring in wet locations.

1946-48. New applications and approvals: machine tool wiring, switchboard wiring, street lighting cable, cords, control cable, and many others.

1951. Acceptance by IMSA for police and fire alarm cable NEC recognition as TW wire through 2000 MCM; Underwriters' approval of Rome Synthinol 901 for 105°C. appliance wiring and, in

1954, approximately 100 million pounds of polyvinyl chloride compounds were used by the wire and cable industry.

CURRENT TRENDS

No. 4 in a series of articles

Progress report on polyvinyl chloride insulations

Since 1932, when researchers started investigating polyvinyl chloride compounds for wire and cable, it has become one of the most popular insulating materials available. In fact, over 100 million pounds were used by the wire and cable industry in 1954 alone!

To bring you up to date on polyvinyl chloride wire coatings and Rome Cable's product—Rome Synthinol® in particular, is the purpose of this brief report.

What are polyvinyl chloride compounds?

These compounds consist of polyvinyl chloride (or a co-polymer of polyvinyl chloride and polyvinyl acetate) thermoplastic resin mixed with plasticizers for flexibility, fillers for strength, pigments for color, and stabilizers for resistance to age and oxidation. The combined properties of these ingredients determine the properties of the compound. The compounds are thermoplastic in that they do not require vulcanization. They are generally applied to wire by the extrusion process.

Polyvinyl chloride compounds produced by Rome Cable bear the registered trade name Rome Synthinol®.

Characteristics of Rome Synthinol

Rome Synthinol has earned its popularity because of these desirable characteristics:

Economy—low in cost; and because of its small diameters, handling and installation costs are minimized

Simplicity—no outer braids required

Flame Resistance—inherently resists burning

High Dielectric Strength—higher than most rubber compounds

Moisture Resistance—superior to many rubber compounds

Appearance—bright, shiny colors

Weather Resistance—unaffected by long exposure to sunlight and weather

Versatility—suited to many low-voltage insulation and jacket applications—indoors or out, in conduit or duct, in water, or in the ground

Special compounds

Because polyvinyl chloride insulation and jackets derive their properties from the materials they contain, it is possible —through proper ingredient selection —to "engineer" compounds for specific end uses. Here are some of the special applications:

Cold—special compounds are available for low-temperature applications—down to 40°C. and lower

Heat—special compounds are available for high-ambient conditions—up to 105°C.

Deformation—special compounds, or special cable design, can reduce this effect

Moisture—most polyvinyl chloride compounds have very good moisture resistance. But careful selection is advised if dc potentials are involved in wet locations.

Polyvinyl chloride insulation should not be used where heavy and/or frequent current overloads are involved (such as in network cable). And because of relatively higher dielectric losses, it is not generally recommended for the higher primary distribution voltages.

Specifications

The various polyvinyl chloride wire and cable industry specifications in use today are: Underwriters' Specifications; ASTM D734; IPCEA Appendix I for insulation, Appendix J for sheath; Federal Specification JC-129; IMSA Specification No. 20.

There are also, of course, many individual customer specifications applicable for specific end uses.

Typical applications

Rome Synthinol and other polyvinyl chloride materials are suited for these wire and cable applications:

Type TW building wire
Nonmetallic sheathed cable
Type UF underground feeder cable
Machine tool wire
Station control cable
Series street lighting cable
Multiple street lighting cable
Multiple conductor instrument wiring
Fire alarm and traffic signal cable
Over-all jackets
Fixture wires
Radio hook-up wire
Appliance wires

Further developments

From its active and pioneering part in the development of polyvinyl chloride compounds, Rome Cable's experience is reflected in Rome Synthinol Cables. Special Rome Synthinol Compounds are available for many unusual applications.

A notable example is Rome Synthinol 901, the first high-temperature polyvinyl compound to receive appliance wire listing for 105°C., and later approved for use on TW moisture-resistant building wire. Because of other outstanding properties—increased resistance to oils, solvents, and chemicals —Synthinol 901 has proved itself as a preferred insulation material for chemical, petroleum, and other industrial wiring where high temperatures and environmental hazards are a continuous problem.

If you have a wire and cable problem for which a polyvinyl chloride compound might provide the answer, our experience is at your service.

ROME CABLE CORPORATION, Rome, New York

Money-Back Brings Money In

CEI puts refund guarantee on both dryers and ranges in fall campaign; finds plan brings big sales, few bounce-backs

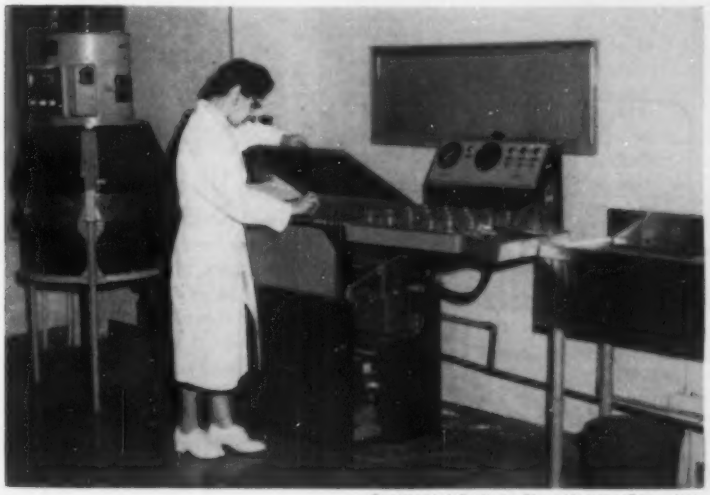
Flushed with the success of last spring's "Guaranteed Delight" dryer campaign, Cleveland Electric Illuminating Co is pressing its refund guarantee into still other unexplored appliance territory.

This time it is extending its famous money-back plan to both dryers *and* ranges. Using two-page newspaper spreads to open the campaign, CEI offered its customers this deal:

"If any residential customer of the Illuminating Company buys and installs an electric range or 240-v electric dryer in her home between Sept. 12 and Nov. 26, 1955, and within 30 days after installation tells us that she is not completely delighted with it, we will immediately, on clear title release (of the appliance), arrange to have it removed and the purchase price refunded."

Refund also includes normal installation costs in the case of the range and cost of necessary indoor wiring in the case of the dryer. Customer must live in single or double-family dwellings. The three-wire outdoor installation—pole to meter, to main switchbox—is provided free by CEI.

The utility's first dryer money-back venture last February and March (EW, April 25, p. 55) showed sales gains of 35% in the first month and 86% the second. Officials said demands for refunds were almost nil.



Continental Radiant Glass Heating Corp photo

Electric Heat Cuts Insurance Rates

In laboratories where inflammable mixtures are used, fire insurance rates are naturally higher. Not so at the newly opened laboratories and offices of York Research Corp at Stamford, Conn. By installing electric heat the fire hazard was removed and insurance rates, says President Holcomb York, "were reduced so low it amazed us." Building is equipped with twenty 1,500-w, ten 750-w, and two 1,000-w radiant glass panels. Heat loss for the new structure is 40,000 w or 136,000 Btu's. Other reasons York chose this type of heating system: No upkeep is needed, extra storage room was gained by eliminating need for central heating unit and fuel storage space, it is cleaner and healthier, and it is more accurately controlled than other types of heat.

Lighting Program Ready for Vocational Classes

A lighting education program for use in vocational and industrial arts classes at the junior and senior high school level is now being released by Better Light Better Sight Bureau.

Titled "Working With Light," the new program is patterned after three other BLBS programs now in use. It includes:

- A lighting handbook for use by the teacher and as a shop reference text.
- Twelve different project leaflets with instructions for building properly designed lamps and fixtures.
- Student reference folder which summarizes lighting principles involved in the projects.
- National Education Association manual, "Teaching About Light and Sight."

H. A. Stroud, promotion manager of Monongahela Power Co and bureau chairman, says he expects that electric companies in many localities will help to make the new program available to school shops in their areas.

Materials were prepared by the bureau's Commercial and Industrial Lighting Education Committee, H. B. Gould, Ohio Edison Co, chairman. Program's subcommittee was chairmanned by B. J. Jensen, Public Service Electric and Gas Co.

Toledo Edison Co Quits Direct Appliance Selling

After 42 years of direct electric appliance merchandising, the Toledo Edison Co is going to quit.

When present stocks are gone, it will turn its entire promotional efforts over to its cooperative program with dealers and distributors.

Reason: The company's importance in appliance selling, says John K. Davis, vice president and assistant general manager, has diminished as the number of appliance dealers has increased and as their sales efforts have become more aggressive and effective.

The company is working with dealers to place salesmen who will be affected by the change. Meetings with dealers and distributors are being held to discuss the change in policy.

Gadsden Ships First Transformers

First shipment of distribution transformers from the new transformer manufacturing facilities of Allis-Chalmers Mfg Co at Gadsden, Ala., left recently for the Alabama Power Co. The new facility becomes the fourth Allis-Chalmers transformer manufacturing plant, augmenting production at Milwaukee, Pittsburgh and Terre Haute.

J. W. McMullen, vice president and general manager in charge of the power equipment division, in commenting on the significance of the Gadsden Works expansion, stated, "We had to expand, and we chose this location because of its geographical location, its experienced workers, its abundant natural rescurces, fuels and electric power."

The Gadsden plant property consists of 335 acres, with 318,698 sq ft under roof. S. W. Ouweneel, is general manager of the plant.

Looking over the first transformer produced at Allis-Chalmers new Gadsden plant are (left) J. W. McMullen, Allis-Chalmers vice president, and O. K. Seyforth, vice president in charge of the eastern division, Alabama Power Co, Anniston, Ala.

FWD Caravan Exhibits New Utililty Trucks

A Traveling Truck Show of the Four Wheel Drive Auto Co, Clintonville, Wis., is part of FWD's 45th Anniversary. It's schedule is a coast-to-coast tour of 12,751 miles in 38 states, with 64 stops in 5.5 months.

The FWD caravan is an introductory showing of a Model U-150 "Rhino" utility line truck with front-mounted digger and derrick, a highway maintenance truck with six-yard dump body, a pumper fire engine, and a Model 6-325 six-wheel-drive truck suitable for utility construction and transformer hauling. All have a power-proportioning center differential which distributes engine torque in relation to truck weight and load.

The eastern exhibition was launched in Chicago. Here it attracted a crowd of utility personnel, with attention centered on the new U-150 truck. The show is proceeding on a 3-month, 6,000-mile trip to 33 cities from Maine to Georgia and west to Missouri. The western tour is completed.

Johns-Manville to Expand Industrial Products Div.

Johns-Manville Corp will separate its present Industrial Products Division into three new operating divisions: Pipe Division, Packings and Friction Materials Division, and Industrial Insulations Division. A. R. Fisher, president of the company, said that the new arrangement will be effective Jan. 1, 1956.

John A. O'Brien will head the industrial products as vice president for Industrial Products Division and continues as a senior vice president of Johns-Manville Corp.

Don L. Hinmon will be general manager of the Industrial Insulations Division and has been elected a vice president of Johns-Manville Sales Corp.

Robert F. Orth becomes general manager of the Pipe Division and vice president of Johns-Manville Sales Corp.

Francis J. Wakem becomes general manager of the Packings and Friction Materials Division and continues as vice president of Johns-Manville Sales Corp.

Electric Controller Sees Business Up 10-20%

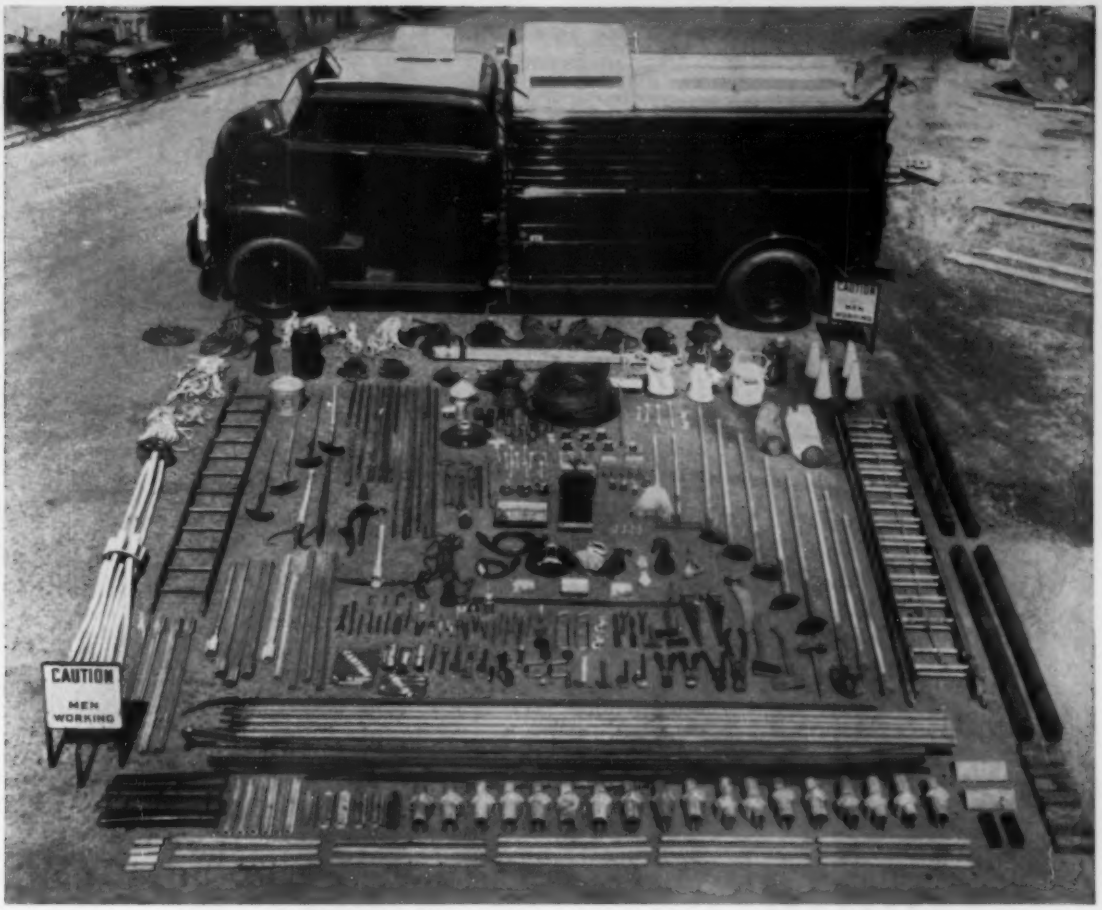
A further substantial increase in the electrical equipment business was forecast by district managers and sales representatives of the Electric Controller & Manufacturing Co at their annual Cleveland sales conference.

"In the opinion of many of these men," A. C. Dyer, vice president-sales of Electric Controller, said, "continued expansion in some industries and new modernization programs in others will mean between 10 and 20% increase in business over the next 12 months.

"All of our men, including those from both East and West Coasts, Canada and Mexico," Dyer added, "are unanimous in feeling that considerable business will be forthcoming as a result of improvements to existing facilities by many industries."

Major industries listed for further expansion were aluminum, cement, chemical, petroleum and steel—with

(*Continued on page* 59)



Look at your line truck equipment needs from this angle . . .

Here's a poles-eye view of a typical utility line truck showing the wide variety of construction and maintenance tools and safety equipment your linesmen need for most day-to-day jobs. But—without exception—each and every item shown can be ordered conveniently from your nearby Graybar office or warehouse . . . and in every case you get the type and quality needed to assure speed and efficiency on the job *plus* long years of satisfactory service. All are products your linesmen know and respect—products that have been tried, tested and proven in the field by scores of companies just like your own.

Remember, when you order "via Graybar", you save the time and expense of multiple inquiries, for you can select, from this single source, the items best suited to your needs from among the products of over 200 of the nation's leading manufacturers.

Graybar is thoroughly familiar with utility requirements. Further, your nearby Graybar Representative stands ready to help as a convenient source of information on everything needed for pole-line construction and maintenance. And should you be faced with an out-of-the-ordinary problem, call on the experience of a Graybar Outside Construction Specialist for a consultation. We'll welcome your inquiry!

511-910

CALL GRAYBAR FIRST FOR . . .

Everything Electrical

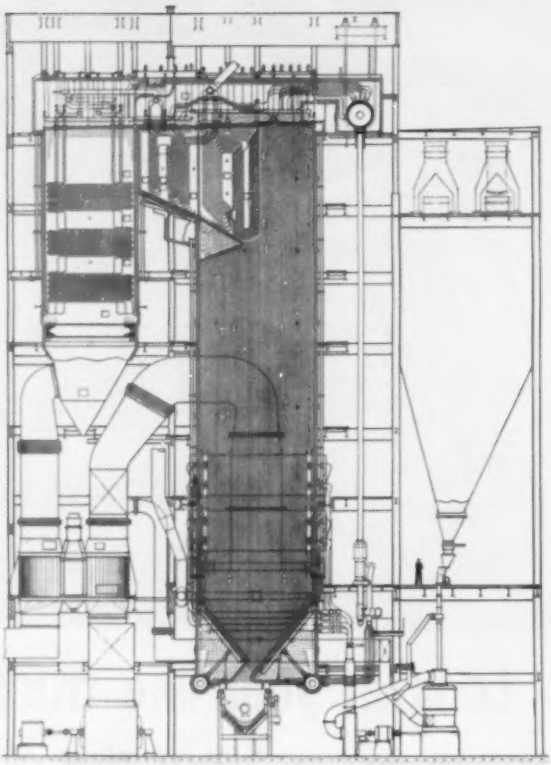
GraybaR ELECTRIC CO., INC.
420 Lexington Ave., New York 17, N. Y.

IN OVER 120 PRINCIPAL CITIES

RIVER ROUGE STATION

The Detroit Edison Company

C-E controlled circulation boilers



The C-E Unit shown above is presently under construction for the River Rouge Station of The Detroit Edison Company at River Rouge, Michigan.

This boiler is designed to serve a 260,000 kw turbine-generator operating at a throttle pressure of 2000 psig at maximum rated capacity with a primary steam temperature of 1050 F, reheated to 1000 F.

It is of the controlled-circulation, radiant reheat type with a separated furnace arrangement. Secondary superheater surface is at the outlet of one furnace and reheater surface at the outlet of the other. Primary superheater sections and economizer surface follow both the secondary superheater and reheater surfaces. Regenerative air heaters follow the economizer surfaces. The section shown above is taken through the superheater furnace.

Pulverized coal firing is employed, using bowl mills and tilting, tangential burners. Arrangements are made to use oil as an alternate fuel.

9-876

COMBUSTION ENGINEERING, INC.

Combustion Engineering Building
200 Madison Avenue, New York 16, N. Y.

STEAM GENERATING UNITS; NUCLEAR REACTORS; PAPER MILL EQUIPMENT; PULVERIZERS; FLASH DRYING SYSTEMS; PRESSURE VESSELS; DOMESTIC WATER HEATERS; SOIL PIPE

Electric Controller

(*Continued from page* 56)

particular emphasis on new refineries and cement plants. Some potential sources of new business for electrical equipment suppliers were indicated as: Mining in the Birmingham area; replacement of old machine tools and more use of automation in Detroit factories; further revamping of steelmaking facilities in the Pittsburgh area; continued modernization in steel plants and improvements in plants for manufacture of agricultural implements and of paper products in Canada; and additions to glass-making facilities in Monterey, Mexico, area.

Ward Leonard Acquires Interest In Canadian Firm

Ward Leonard Electric Co, Mount Vernon, N. Y., has acquired a substantial interest in D. M. Fraser, Ltd., Toronto, according to an announcement by Arthur A. Berard, president of Ward Leonard. Fraser, Ltd., has been a Canadian distributor and manufacturer of industrial and marine electrical control equipment for 34 years, and has been Ward Leonard's Canadian representative since 1925. Under the new agreement D. M. Fraser, Ltd., will furnish manufacturing facilities in Canada for Ward Leonard products.

New officials of D. M. Fraser, Ltd., are: W. L. Berry, treasurer of Ward Leonard Electric Co, who is president; G. M. Fraser is vice-president in charge of sales; C. A. Wilde is vice-president in charge of engineering and manufacturing; and K. A. M. Hayes is secretary-treasurer.

Non-Tracking Butyl

. . . makes possible butyl-molded instrument transformers for 15 to 34.5-kv levels

A non-tracking butyl insulation capable of withstanding high voltages makes practical butyl-molded instrument transformers for voltage ranges 15,000 v and above, for outdoor service. This new insulation, designated HY-BUTE/60, was developed in the Measurements Laboratory of General Electric Co's Instrument Department at Lynn, Mass. In announcing this development E. E. Parker, general manager of the department, said: "There are a vast number of potential applications of insulating materials having the build-in non-tracking mechanism."

Use of organic materials such as ordinary butyl for outdoor insulation has up to now been limited to 600 and 5,000v because of their inability to withstand electrical discharges.

M. A. Princi, in charge of the Laboratory, said that the new butyl formulation incorporates an additive built into the butyl rubber during compounding. When the product is subjected to severe surface sparking, the additive initiates an oxidation reaction in which the gaseous oxides of carbon are formed. No free carbon is formed on the surface and, therefore, no carbon track can result. Thus is prevented the consequent failure that occurs if organic components of the insulation break down. The additive does not significantly modify the other properties of the insulation. Cost is a little higher than older type insulation but cost of the final product is not changed.

HY-BUTE/60 molded 15-kv current transformer is shown by E. E. Parker

GE pioneered the use of 600-v indoor-outdoor type, butyl-molded current transformers since 1951 and the 5-kv outdoor type transformers since 1953.

J. D. Thompson, manager of engineering, said that both outdoor and indoor type 15-kv current transformers will be available about January 1956. Under development are transformers for 25-kv and 34.5-kv voltage levels, scheduled to be ready for production by the end of 1956. Ratings up to 800/5 amp are being designed. Potential transformers are expected to be in production in the summer of 1956.

Cubage and weight of the current transformers and potential transformers will be reduced 25 to 50%, with the greater reduction in the higher voltage classes.

MANUFACTURER'S BRIEFS

Phelps Dodge Corp and its subsidiaries —Phelps Dodge Refining Corp and Phelps Dodge Copper Products Corp —will move their executive offices to 300 Park Ave, New York 22, N. Y., from 40 Wall St, New York City, after the third week in October.

Minneapolis-Honeywell, General Mills and Northern States Power Co have launched a program for the study and evaluation of peaceful uses of atomic energy. The University of Minnesota, stated Athelstan Spilhaus, dean of the Institute of Technology, will participate in the program and become a member of the operating committee of the Minnesota Nuclear Study Group.

Westinghouse Electric Corp and Westinghouse Air Brake Co announced jointly that the Electric Co has purchased from the Air Brake Co 187,480 shares of the Canadian Westinghouse Co, Ltd., for $54 a share. The Electric Co now owns 70% of the common stock of the Canadian firm. A later report indicates the Electric Corp has offered to purchase the minority stock of its Canadian subsidiary.

RWMA—Resistance Welder Manufacturers Association reports that business for the first eight months of the year is 30% above orders received during that period in 1954. Shipments through August show a 14% gain over the same period last year.

BUSINESS OUTLOOK

Electrical World

OCTOBER 10, 1955

The outlook, in brief: Business is still going strong, despite the jolt the President's heart attack gave the stock market. But rising prices have many people worried about another round of inflation. Industrial prices as measured by the U. S. Bureau of Labor Statistics hit a new record high in September. They'll no doubt continue upward in this fourth quarter, as the effects of the wage increases earlier this year percolate through the economy.

The table below shows the rise so far. Industrial prices hardly budged during 1954. By June 1955 they had edged up a little over a point. Now they are 2% higher than at midyear.

Industrial Prices*

Monthly Average in 1954	114.5
Monthly Average, first half 1955	115.5
June	115.6
July	116.5
August	117.4
September (est.)	118.0

*Wholesale prices other than farm and food.

What prospects are there that prices will run away in 1956?

▶ In the building field, contractors are predicting that construction material prices will continue to go up. About 74% of those queried by the Associated General Contractors last month expected prices of building materials to increase further by February. Another 26% predicted no change. **None expected prices to drop.**

▶ In other fields, too, there are indications of broad price increases. 1956 models of one major auto producer are from $75 to $100 higher than on comparable 1955 models. And other producers have hinted at price increases reflecting the rise in labor and material costs.

▶ Prices of most appliances will be higher next year, too. Several major manufacturers have announced price increases of 1956 TV sets. After the Christmas buying season, prices of other appliances are likely to go up also.

Inflationary price increases may wipe out part of the tax-cuts expected in 1956—an election year. But all of the price increases announced by manufacturers won't be passed on to consumers, by any means. Consumers will continue to be able to make bargains when buying cars, appliances, and other major durable goods. Record output of most items and climbing inventories will see to that. So fear of another inflationary spiral as in 1951, after Korea, is unwarranted.

Is the jittery stock market a good indicator of feeling about the business outlook for 1956? Does it mean businessmen are uncertain about next year? We don't believe it does. Most forecasts are predicting continued good business in 1956. And industry is backing up this optimism with heavy orders for machinery and factory buildings.

With consumers better off than they have ever been—and in a buying mood, there is nothing in the business outlook to cause us to lower our sights for 1956.

One-stop "shopping"

for your instrumentation needs!

WHATEVER your measurement and control problem . . . simple or complex . . . large or small . . . you'll find exactly the instrumentation you need in Honeywell's extensive, varied line of products.

What variables do you need to measure? This family of instruments covers temperatures, pressures, flow, frequency, power and practically everything that anyone would want to know about to supervise a process.

What accuracy do you require? Honeywell offers you a full selection, ranging from high-precision *ElectroniK* instruments to relatively simple protective devices.

Need control? You can choose from a line that extends from self-contained valve controllers small enough to hold in your hand, to complex graphic panels that regulate a complete manufacturing plant.

Instrumentation by Honeywell means a single responsibility for your complete control equipment . . . coordinated engineering, production and delivery. It gives you the important plus values of simplifying the training of your instrument maintenance men, and of minimizing your maintenance parts stock problems. And because this line is so complete, the instrumentation recommended for your application is selected without bias . . . needs no stretching or squeezing . . . represents the best combination of performance and economy for its intended job.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pa.

MINNEAPOLIS **Honeywell**

BROWN INSTRUMENTS

First in Controls

● REFERENCE DATA: FOR A QUICK LOOK AT THE COMPLETE HONEYWELL LINE, WRITE FOR COMPOSITE CATALOG NO. 5001

IN THE INDUSTRY

Nuclear Power Lights First Town

Here's the story behind AEC's pioneer attempt to serve an American town with electricity from an atomic plant and how Arco, Idaho, won a place in history

- Have you ever heard of a hush-hush publicity task?
- Did you know that an Atomic Energy Commission chairman once told a fib to keep a secret?
- Can you imagine that an electric company out in the intermountain states could have a role to play in nuclear history and in international competition?

These are all elements in the fascinating story of the first American town ever lighted and powered entirely from nuclear energy. Parts of the story can't be told even yet, but here are some highlights:

Back in the spring of this year some of the top thinkers in the U.S. peacetime nuclear power program set about to make certain that this country would put its best foot forward at the atoms-for-peace conference held in Geneva in August. This country had a dozen or so experimental reactors in various stages of design and operation, but not a one had ever produced power for commercial use or for use in American homes and factories.

Russia Bragged about 5,000-Kw Model

Russia, on the other hand, had proudly proclaimed that its first power reactor, a 5,000-kw model, had been put in the service of its citizens and its industry.

A group of scientists at the Arco (Idaho) installation set about to remedy the situation—and in a big hurry. The second boiling water reactor experiment (Borax II) was in operation and producing sufficient heat energy to power a small town. The problem was to hook on a generator and transmit the power to electric customers. There was one further requirement. The whole thing was to be kept secret until the U.S. delegation to Geneva chose to spring the story at the international conference.

Key personnel from Utah Power & Light Co were called in to help on the transmission and distribution problem. By making use of an old out-of-service transmission line, Utah P&L and AEC engineers devised a scheme to isolate electrically the town of Arco so that it could be served wholly from the nuclear fueled plant. AEC scouted for and picked up a 3,500-kw generator to hook on to Borax II. Transformers were hauled in to step up the generation voltage from 2,300 to 10,500v. Utah P&L's portable substation was brought in the scheme to boost voltage to 44,000 for transmission.

Arco's Day of Glory—July 17

On the night of Sunday, July 17, the town was lighted from the nuclear-fueled plant. Beginning at 11:26 PM and for more than an hour thereafter the town of Arco was fed power from Borax II. Camera crews ground away at the Sunday night scene. Utility crews switched off other incoming power and opened the lines from Borax. The scene was duly recorded on film, and records were put in acceptable order.

The records and the film were then tightly canned for use by the U.S. delegation to Geneva. Inhabitants of Arco never suspected the historic role they had played merely by switching on their home lights. Seldom has a publicity task been as closely guarded.

The next day, amid great celebration, another reactor at West Milton, N. Y., turned power into the Niagara Mohawk Power Corp System. At the switch-throwing ceremony, AEC Chairman Lewis L. Strauss characterized the West Milton project as the first use of atomic power for home and industry. Whether he knew of the successful Arco experience, it's hard to tell. In any event, it wouldn't be the first time that top AEC officials were behind on the news of their own experiments.

The Arco story finally came out at the Geneva conference. For a brief day the town of Arco found its place in front page headlines the world over.

TECHNICAL NOTES

Accurate detection of ground-fault currents for relaying cable feeders is possible with a single through-type current transformer surrounding all phase conductors. Cable sheath and armor, and ground conductor, must be so terminated as to avoid inclusion in metered current.

The stud itself serves as an electrode in a new method for arc-welding steel studs to steel surfaces. A welding cartridge containing the igniter compound, slipped over end of stud, makes initial contact with plate and holds pool of molten metal until stud is pressed into position.

Liquid CO_2 has been harnessed as a source of energy to close medium-voltage power circuit breakers.

Conductor galloping tests are expedited by attaching elliptical sections of cast wax to simulate ice and divorce research from vagaries of weather.

Electric water heaters of assorted sizes and ratings, under thermostatic control, contribute a diversified average of 0.6 kw to rural evening peak demands.

Computer types used for clerical operations are not always well adapted to engineering and managerial problems.

Speed in melting transmission-line ice is wise because the snow which often follows an icing period can hamper travel of switching or maintenance crews.

Illinois Utility Gets Hike . . .

. . . in electric rates of $1,450,000 annually or 91% of the $1.6 million amount requested by the Central Illinois Light Co

The Illinois Commerce Commission has granted Central Illinois Light Co a $1,450,000 a year rate increase or 91% of the $1.6 million originally requested by the petitioner. The order was dated Sept. 8.

As to the rate base the net original cost of the company was established at $47,764,676. The evidence with respect to trended original cost rate base at June 30, 1954, showed a gross amount of $107,062,310 and $85,-156,718 less observed depreciation and obsolescence. The order noted that "their (ie, the staff's) examination substantiates the trended appraisal introduced by the company.

Cost of Reproduction Cited

"However, a company witness testified that due to methods of construction, reproduction costs for this property would be approximately 2½% less than the trended original cost which makes the cost of reproduction less depreciation $83,027,800 before removal of the investment in Capitol Avenue generating plant from electric plant in service."

The order continued: "The company presented evidence as to its requirements for working capital of approximately $1,062,000. This is based upon the usually accepted 45 days of operating expenses, less the cost of purchased power. It presented further evidence to show that the average of the monthly balances of necessary investment in materials and supplies is approximately $1,538,000. The total for these two items is $2.6 million."

Fair Value Considered

"The commission has given consideration to all of the evidence in this case in relation to the several factors necessary and proper to consider in arriving at the fair value for rate making purposes of the company's property including the fact that the Capitol Avenue generating station is no longer operative.

"Upon consideration of all of the evidence of record with regard to fair value, we hereinafter find that the fair value of the company's property used and useful in rendering electric service is $58,500,000."

It should be noted that the above fair value rate base is 16.2% over and above the net original cost of the property including materials and supplies and working capital.

Cost of Money: A Factor

As to the rate of return the ICC order stated that "the company and the cities offered testimony as to the cost of money to the company to be used in determining the proper rate of return.

"The commission has examined the requirements of the company in the light of prevailing economic conditions, trends of the money market and earnings for investments having similar risks and is of the opinion that a rate of return for the company's electric utility property of approximately 5.8% on the fair value thereof is just and reasonable.

"On the basis of the foregoing, it may be determined that the amount available for return should be approximately $3,393,000 and we will hereinafter find that such an amount is reasonable."

Large Customers: A Problem

Some of the problems which utility companies face in applying rate increases to large customers or to customers with special situation is illustrated by the following quote from the order which said "Intervener Standard Brands contended that the commission should modify the company's proposed standby rate 24P to lower the percentage of increase to Standard Brands.

"The evidence shows that Standard Brands operates its own generating equipment and purchases standby service from the company, taking only a limited amount of energy in four out of twelve months of the test year, a total of 4,944 kwhr. The contract demand between the parties during this period was for 600 kva. Under the rates proposed by the company the capacity charge includes the cost of the first 50 kwhr per kva of billing demand. This schedule results in a substantial increase in costs to those customers whose use of standby facilities is slight.

"In the case of Standard Brands, the increase in cost would be approximately 68%. While the cost of this service generally would not be unreasonable under the company's proposal, especially since the billing demand may be as low as 60% of the contract demand, nevertheless the rate as written is not acceptable and the rate hereinafter authorized will be a revision of the proposed rate to reflect a substantially lesser increase."

It is also of interest to note that the commission recommended the use of a standard fuel adjustment clause for all rates.

FINANCIAL BRIEFS

About half of Pacific Power & Light Co's common stock dividend this year will be tax free.

Jacksonville, Fla., Mayor Haydon Burns has signed into law the utility tax ordinance calling for a 10% tax on utilities, including electric, gas, and telephone service. The law, a revival of a tax which was levied from 1947 through 1951, will become effective with the beginning of the city's next budget year on Jan. 1, 1956, the mayor said.

Brazilian Traction Light & Power Co has decided not to declare any further cash or stock dividend for payment in 1955 on the ordinary shares. Last payment was a stock dividend of 5% and 3¢ a share in cash in January. Pres Henry Borden told the stockholders that the company will need further rate increases before its net income will again be sufficient to restore dividends at a rate equivalent to those paid prior to 1953.

Mexico's President Adolfo Ruiz Cortines has announced that the Federal Electricity Commission has invested a total $18,640,000 in its plant account for year from September, 1954 to September, 1955. "In view of fact

that nearly 50% of our population lacks electric services", said the president, "the government is speeding its electrification program. Besides the projects undertaken by the Federal Commission, a fair deal will be given private enterprise so that, taking into consideration national interests and those of consumers, they may expand their own activities. Thus we will be able to obtain the electricity the economic and industrial progress of the nation is demanding."

Mexico Light & Power Co's Pres William L. Daper, Jr, said that he expects the company to double its installations and load in the next ten years. To do this, he said, it will be necessary to seek financing outside Mexico. He thought the company will need around $200 million to take care of its expansion program.

General Public Utilities Corp raised its quarterly common stock dividend to 40¢ from 37½¢ and has voted a 5¢ special, same as in the previous quarter.

Niagara Mohawk's Plant Exempt from Use Taxes

The building and equipment used in producing electricity at the Huntley steam plant of Niagara Mohawk Power Corp are exempt from the Erie County sales and use tax, the Appellate Division, Fourth Department, ruled unanimously.

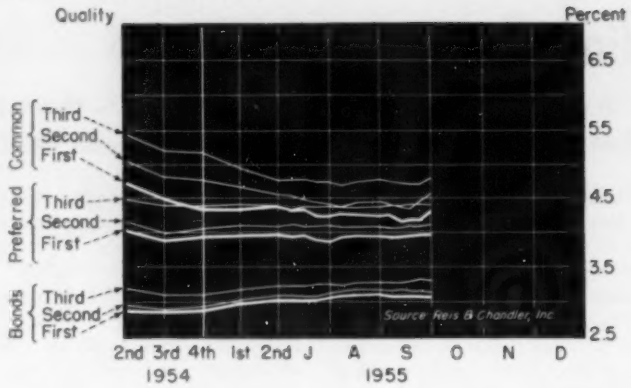
The court annulled a determination of George W. Wanamaker, as Erie County sales tax director, that the company had a tax deficiency of $67,293.89 plus $6,069.51 interest up to Dec. 15, 1952.

The tax was levied for the last two quarters of 1949, all of 1950 and 1951, and the first three quarters of 1952.

Items on which the disputed tax was levied included various coal and ash-handling equipment, superstructures which support machinery, and the plant building itself. The county claimed that these items are not used directly and exclusively in the production of electricity, and therefore are taxable.

In a five-page opinion for the court, Justice Raymond C. Vaughan of Buffalo held that the one purpose of the sales and use tax is to reduce multiple taxation.

Today's Utility Yields (%)



	BONDS			PREFERRED STOCKS			COMMON STOCKS		
QUALITY	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
Sept. 29	3.11	3.15	3.32	3.98	4.11	4.39	4.31	4.57	4.79
Sept. 22	3.12	3.17	3.33	3.98	4.10	4.39	4.19	4.45	4.70

Utility Earnings

COMPANY	PERIOD MONTHS	ENDED	NET INCOME 1955	NET INCOME 1954	EARNINGS PER COMMON SHARE 1955	EARNINGS PER COMMON SHARE 1954
Baltimore Gas & Electric	8	Aug.	$10,011,000	$8,081,000	$1.55	$1.32
Kansas City Power & Light	12	Aug.	7,495,891	6,744,223	2.25(a)	2.21(a)
Montana Power	12	Aug.	8,329,140	7,600,903	2.87	2.64
Pennsylvania Power & Light, consolidated	12	Aug.	21,824,865	20,466,253	3.05	2.84
Texas Utilities, consolidated	12	Aug.	24,254,922	20,746,474	4.11	3.51
Virginia Electric & Power	12	Aug.	18,810,852	15,128,610	2.51(b)	2.14(b)
West Penn Electric, consolidated	12	Aug.	16,887,786	15,305,558	1.99	1.81

Notes—(a) Based on 2,695,000 shares in 1955 and 2, 450,000 shares in 1954; (b) Based on 6,600,000 shares in 1955 and 5,999,980 shares in 1954.

Utility Financing

COMPANY AND DESCRIPTION	AMOUNT OF OFFERING (000)	OFFERING PRICE	YIELD TO PUBLIC
SEPTEMBER 28—OCTOBER 4			
BONDS AND DEBENTURES			
Pacific Power & Light—1st mtg 3⅛% due 1985	$10,000	101.377%	3.55%
Public Service Electric & Gas—debs 3½% due 1975	35,000	102.173	3.35
SCHEDULE FOR OCTOBER			BID DATE
BONDS			
Worcester County Electric—1st mtg due 1985	$8,500	.....	Oct. 18
New York State Electric & Gas—1st mtg due 1985	15,000	.....	Oct. 19
Long Island Lighting—1st mtg due 1985	15,000	.....	Oct. 26
PREFERRED STOCK			
Pacific Gas & Electric—1,000,000 sh $25 par	$.....	.....	Oct. 25(a)
COMMON STOCK			
Louisville Gas & Electric—160,000 sh (to be offered commonholders on 1-for-10 basis, record about Oct. 13 to expire Nov. 1)	.....	.....	.....
New York State Electric & Gas—303,407 sh (to be offered commonholders on 1-for-10 basis, record Oct. 18 to expire Nov. 3)	.....	.....	.....
Indianapolis Power & Light—209,685 sh (to be offered commonholders on 1-for-15 basis, record about Oct. 27 to expire Nov. 10)	.....	.....	.....

Notes—(a) Blyth & Co, underwriter.

Semiautomatic production line for manufacturing and cladding fuel elements at Sylvania's Hicksville, N. Y., plant.

Cutaway showing canned fuel element with high-integrity bond (1.5 times actual size).

Inside story of nuclear fuel

THE attainment of economically generated atomic power demands effective performance from the nuclear fuel elements employed. Such a fuel must be capable of high-temperature operation for an extended period of time and some of its important attributes are—

❶ A strong, continuous bond must be present between the metal casing and the core of active material (see illustration above). Voids or discontinuities in the bond may cause hot spots and the premature destruction of the fuel element.

❷ The active core material and casing must be of a physical construction that will withstand incessant bombardment within the reactor—yet allow heat to flow readily and uniformly to the coolant stream.

❸ The bond between casing and end cap must be so complete as to prevent seepage of the coolant into the element core—and the escape of fission products from core to coolant stream.

Techniques for insuring these as well as many other important qualities have been perfected through Sylvania's specializing fuel element research and production facilities. Sylvania's scientists and engineers—pioneers in the development of high, long burn-up fuel—are ready now to help you design fuel economy and reliability into your power production or experimental reactor.

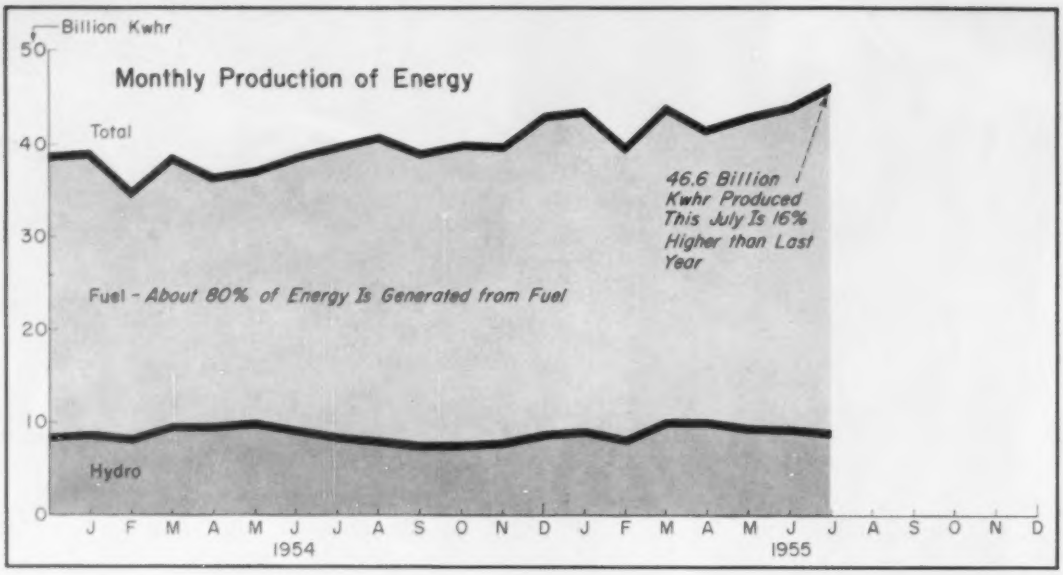
For detailed information, including a newly-published brochure on Sylvania's nuclear energy design and production facilities—write Sylvania Electric Products Inc., Atomic Energy Division, P. O. Box 59, Dept. **2821,** Bayside, New York.

SYLVANIA®

ATOMIC ENERGY DIVISION

LIGHTING • RADIO • ELECTRONICS • TELEVISION • ATOMIC ENERGY

STATISTICS


Billion Kwhr
50
40
30
20
10
0
Monthly Production of Energy
Total
46.6 Billion Kwhr Produced This July Is 16% Higher than Last Year
Fuel - About 80% of Energy Is Generated from Fuel
Hydro
J F M A M J J A S O N D J F M A M J J A S O N D
1954
1955

Power Statistics . . .

			Latest Month	Preceding Month	Year Ago	Annual Change %
Capacity	million kw	July	108.79	107.62	96.98	12.2
Peak—Class I Systems	million kw	July	89.3	86.6	78.2	14.2
Estimated Dec. '55 Peak	million kw	July	96.3	96.6	96.1	0.2
Production—billion kwhr		July	46.63	44.23	40.13	16.2
Hydro			9.35	9.71	8.75	6.8
Fuel			37.28	34.53	31.38	18.8
Sales—billion kwhr		July	40.89	40.17	35.01	16.8
Residential			9.89	9.57	9.11	8.5
Commercial			6.92	6.48	6.40	8.0
Industrial			21.50	21.5	16.97	26.7
Other			2.59	2.38	2.51	2.9
Fuel Consumption		July				
Coal—million tons			11.72	11.07	9.41	24.5
Oil—million barrels			4.62	4.69	4.44	3.9
Gas—billion cu ft			126.25	107.42	128.36	−1.6
Net Income Class A & B Co's	$ million	July	89.87	96.75	83.84	7.2
Residential Customers—millions		12 mos.	43.74	43.64	42.48	3.0
Revenue per kwhr		ended	2.67¢	2.67¢	2.71¢	−1.5
Avg kwhr per customer		June	2,649	2,637	2,442	8.5
Avg annual bill			$70.73	$70.41	$66.18	6.9

Business Statistics . . .

Indexes: 1947-49 = 100					
FRB Industrial Production	Aug.	140	131	123	13.8
ENR Construction Cost	Sept.	141.0	141.0	134.3	5.0
BLS Cost-of-living	Aug.	114.5	114.7	115.0	−0.4
NEMA Sales	June				
Insulation materials		158	154	124	27.4
Electric appliances		122	110	102	19.6
Household refrigerators		105	104	82	28.0
Wholesale prices	Aug.				
Motors and generators		121.5	121.5	123.1	−1.3
Transformers and regulators		127.3	127.3	128.1	−0.6
Switchgear and fuses		139.2	135.5	135.1	3.0
GNP—annual rate—$ billion	2nd Qtr.	$385.0	$375.3	$357.6	7.1

ON A BUDGET?

Sure you are. All smart utilities are budget conscious. That's why you watch expenses, operating costs, and transmission equipment investments.

And that's why Moloney is designing and fabricating better transformers for more efficient operation and more dependable performance . . . for your system.

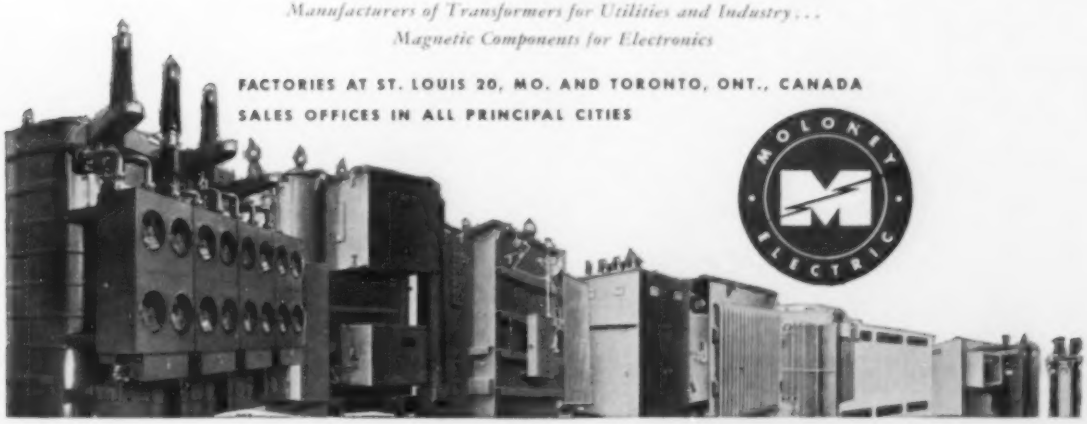
MC-55-42

Specify Moloney and get Dependability at its Best

MOLONEY ELECTRIC COMPANY

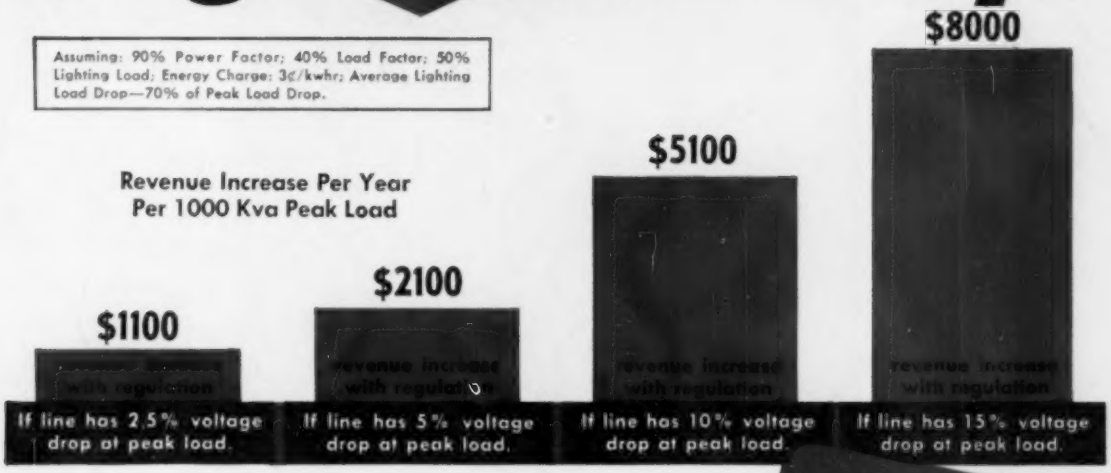
Manufacturers of Transformers for Utilities and Industry . . .
Magnetic Components for Electronics

FACTORIES AT ST. LOUIS 20, MO. AND TORONTO, ONT., CANADA
SALES OFFICES IN ALL PRINCIPAL CITIES



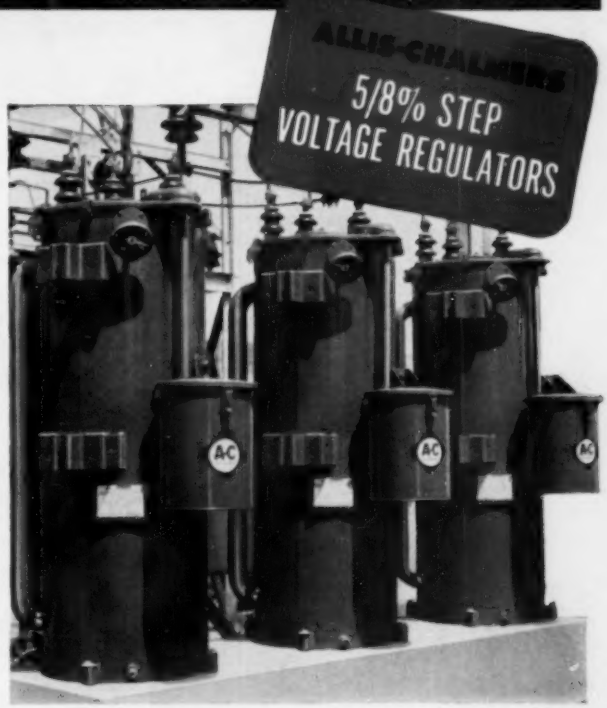
These Figures Prove
Regulation Pays

Assuming: 90% Power Factor; 40% Load Factor; 50% Lighting Load; Energy Charge: 3¢/kwhr; Average Lighting Load Drop—70% of Peak Load Drop.


Revenue Increase Per Year
Per 1000 Kva Peak Load
$1100
$2100
$5100
$8000
If line has 2.5% voltage drop at peak load.
If line has 5% voltage drop at peak load.
If line has 10% voltage drop at peak load.
If line has 15% voltage drop at peak load.

You can increase revenue $2100 the first year with an Allis-Chalmers distribution regulator. That's on a line with only 5% low voltage at peak loads. This increase is more than the regulator costs. Taking all cost factors into consideration, it's enough to pay back initial investment in two years or less, in most cases.

You improve your maintenance picture too, with Allis-Chalmers distribution regulators. Since complaints due to low voltage will be greatly reduced (some operators report them eliminated!), service crews and equipment can be used where they are really needed. No more time and money wasted testing voltage at customers' homes.



Low Maintenance, Long Life

Hundreds of distribution engineers will tell you that when you specify Allis-Chalmers voltage regulators you get a unit that requires minimum maintenance, gives longest possible life. For example, the mechanism is laboratory tested to withstand 5 million operations. More than 20 years of field operation have added operating proof to these tests. No other 5/8% step regulator offers successful service records like these.

Get more information from your nearby A-C district office on how Allis-Chalmers distribution regulators can make your system pay off with more revenue, more profits. Or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-4546

ALLIS-CHALMERS